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IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

ACQIS LLC *
* March 20, 2024
VS. *
* CIVIL ACTION NO. 6:20-CV-966
ASUSTEK COMPUTER, INC. *
ASUS GLOBAL PTE. LTD. *

BEFORE THE HONORABLE ALAN D ALBRIGHT
JURY TRIAL PROCEEDINGS
Volume 3 of 5

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08:00

08:38 (Hearing begins.)
08:38 THE BAILIFF: All rise.
08:38 THE COURT: Good morning, everyone.
08:38 You may be seated.
08:38 Let's go ahead and take up the issue of the Rule 50 motion with respect to the method claims.
08:38 Yes, sir.
08:38 Yes, sir. Good morning.
08:38 MR. TAMKIN: Good morning, Your Honor. Greg Tamkin on behalf of ACQIS. Thank you for giving us some time to look over the issues and hopefully provide a more cogent argument this morning.
08:38 I think the first place to start is where the Court had trouble, which is the method claims. And I think where the Court was focused is the method claims that -- because there was -- there's a method claim that involves turning on a computer, and I think that's the issue that we were talking about where the Court got hung up.
08:39 But there are actually four method claims, and I would say three out of the four don't require turning on a computer at all.
08:39 And so let me just walk through some of that briefly, and we'll get to the evidence which we can provide with respect to turning on the computer.

You can go ahead and put up the slides.

This is the two claims at issue from the '654 patent, and these are product-by-process claims. And I think it's important to understand that product-by-process claims can be not only proven by circumstantial evidence but are proven typically by the actual result of the product.

And so I give the Court -- I can give the Court a cite on that but -- well, I'll go ahead. The Nichia v. Vizio case. I have the Lexis cite. I can get the Lexis Law cite. It's 219 Lexis 77851, and I'm going to read from Page 23 in that case.

In that case, it says on bottom of 23: Claim 4 of the '375 patent is a method claim disclosing several manufacturing steps, the preparation of an LED chip made of certain materials...

And then it goes on to say all these other things that are very similar.

And the Court says -- or plaintiff says it hasn't met its burden -- excuse me -- defendant says plaintiff hasn't met its burden because it hasn't actually provided the physical nature of the manufacturing.

And the Court says: The claim process requires combining two components that consist of

various different materials. Whether this occurred can be readily determined by an expert after the fact and need not be ascertained through direct observation of the manufacturing process.

And that's at Page 23.

And so ultimately, the Court goes on: It's apparent from the result of the process and what the product is how it is manufactured.

So let's take a look at the particular claim in this case. Those -- Claim 20 has five steps, none of which require turning on a computer or -- as part of the method. They're just looking at a product and seeing if it has been constructed this way.

Claim 21 is the one that sort of -- that -- where there was the discussion about testing.

So the first element is: Providing an integrated CPU and graphics controller on a printed circuit board.

Obviously, that can be determined by determining if there's a printed circuit board, if it has a GPU, and if it has a CPU.

The next step is: Connecting a first low voltage differential signal channel directly to said integrated CPU and graphics controller and the first LVDS channel comprising two unidirectional serial

channels that transmit data in opposite directions.

This says you need to look at -- are -- is the -- are the channels, are the wires connected to the CPU and graphics controller? What type of wires are they? Are they unidirectional channels? Serial channels? And there's been expert testimony about that.

Next is: Providing a connector for the computer that connects to the console.

Are these connected? You can determine that.

Likewise: Providing a second channel to couple the console through the connector, the second LVDS channel comprising two unidirectional serial channels that transmit the data.

Again, is there a couple? Is there a console? Is there a second set of wires or a second channel?

And then: Enabling universal serial bus protocol to be conveyed over the second LVDS channel.

Does -- do those wires, do those materials, are they such that USB serial protocol data can be conveyed? All of that is simply what is the product? What is the result?

And so Claim 20 doesn't involve testing,

08:43 doesn't involve turning it on. It's simply a product.

08:43 Now, Claim 21, where I think there's been some testimony, is: The method of Claim 20 comprising conveying encoded address and data bits of a PCI component interconnect bus transaction for a peripheral data communication in serial form over the first LVDS channel.

08:43 Here, the step is conveying. And conveying the address and data bits is going to happen when the product is turned on as opposed to a -- something that happens now.

08:43 I think you can determine that that will happen when it's turned on, but you have to prove, to the Court's point, that it is turned on.

08:44 And so Claim 21 does require the product to be turned on to meet that limitation. So again, Claim 20, no requirement of testing or turning it on; Claim 21, requirement of testing.

08:44 If we can go to Slide 4, please.

08:44 We can talk about the evidence. And I think I was paraphrasing yesterday, and I want to walk through -- the Court through the evidence.

08:44 First of all, Ms. Ou said in response to a question, and this is on -- at the Trial Transcript 541, Lines 4 through 7: So is it fair to say that ASGL

must rely on someone else to test the products before they get shipped to the United States?

Answer: Yes.

So ASGL is -- must rely -- is relying on someone else to test the products before they get shipped to the United States.

Now, then, just to be clear, if we go to the next witness, was Mr. Morquecho, who was done over deposition testimony: After the products are imported and hit the port in the United States, is there any additional functional testing that's performed by ACI?

No.

So no testing is done by ACI, and we know these products then go to the customer.

So if there is testing, it has to be done by somebody before it gets to the United States based on Ms. Ou's testimony.

Then -- next slide, please.

We know that there's testing because it's all over the documents. For example, here is the annual report, which is in evidence. And the annual report is P-95, and this is at Pages 116 to 124.

The production process of major markets. More than 90 percent of the processes are automated. So then it talks about what are the steps in the

08:45 automated process for the motherboards and VGAs?

08:46 So the motherboards, there's the series of processes that are automated, and then there's the testing process.

08:46 Likewise, for notebooks, which is the laptop computers, which is the bulk of the products accused in this case, or certainly the largest in terms of revenue, there are two that -- the annual report indicates there are two test processes for all of these products.

08:46 And then, finally -- so it's clear that there's testimony that they have to -- that ASUS group defendants do do testing and they rely on somebody to do that testing. So that has to be somebody before it gets to the United States, so it must be turned on in the process if there's a test; otherwise, you have no idea if it works.

08:46 So let's go to the final piece of evidence here. I guess there's two pieces of evidence with respect to Mr. Sarhan.

08:47 So this is in talking about Claim 21. And again, Your Honor, Claim -- this is not about Claim 20, but it's about Claim 21 and that last conveying step there.

08:47 Ultimately, there's a question: Did he

08:47 go to the manufacturing facility? Does he know?

08:47 I didn't go to the manufacturing facility, but I know, like, computers are very complicated products. They have so many different units, interconnecting units. They have hardware. They have software. A lot of things that can actually go wrong.

08:47 So this is why generally manufacturers test their products to make sure, like, you know, like, if they ship them to customers and they have problems, right, you know, then the customers will send them back. It will impact their reputation. And they know ASUS and their website. And then -- like, they say they test their products.

08:47 So the expert looked and their website says they test their products.

08:47 And then on cross-examination, I think he was also asked about this point.

08:47 And if we go to the next slide.

08:48 And this is the -- now, you didn't offer the jury any proof of that, did you?

08:48 I mentioned that I saw some, like, videos from ASUS that shows that the computers undergo testing.

08:48 So ASUS is telling us that the computers

undergo testing. I think the witnesses are telling us that there is functional testing, and I think the documents are telling us that there is testing.

And so based on that, I think there's certainly enough evidence to go to the jury with respect to Claim 21 on testing.

I think with respect to Claim 20, we don't need it.

To just briefly turn to the other claims, Your Honor --

If we can go to Slide 2, please.

This -- just to be -- sort of close the loop on this, Your Honor. I think this also is a claim that doesn't require a computer or a product to be turned on. It's, again, steps of building a product by a process.

Obtaining an integrated processing unit and graphics controller, that simply means that you -- the product has a CPU and GPU. On a single chip, you can determine what kind of chip it is.

Connecting a first low voltage -- and by the way, I'm at, for the record, the '140 patent, Claim 35 -- connecting a first low voltage differential signal channel directly to the CPU and graphics controller. So that means that there is a channel

connected those -- to those two. And then it talks about what kind of channel that is. That can be determined by the end result.

Likewise, connecting a differential signal channel -- I'm sorry. I'm on the next element.

Connecting a differential signal channel directly to the integrated CPU and graphics controller to output video data. This is determined by the ultimate product.

Likewise, providing a connector for the computer for the connection to the external peripheral, you can look at the product. Has a connector been provided?

And then there's a last step of what is the nature of that connector, providing a second LVDS channel to couple the connector to the connector. And so you can determine from the product itself whether or not it has that second LVDS channel that couples to the connector.

So again, there's no testing step. There's no turning it on step to get to any of this in Claim 140.

And then finally, if we just go to the next slide, this is the '797, Claim 36.

Again, from a manufacturing perspective,

08:50 this is all steps that can be determined, and the expert did determine all of these steps based on the product itself.

08:51 And we can look at it briefly, Your Honor. It's mounting the chip and interface controller on a single integrated -- integrated CPU and interface controller on a single chip on a motherboard, determine what the motherboard is, did it have a CPU and interface controller mounted on that as a single chip.

08:51 Likewise, connecting a low voltage differential signal channel directly to the interface controller on the motherboard and then some description of that low voltage differential signal channel. Again, that can be determined by the actual product that has been produced.

08:51 You don't have to see -- and the case law's very clear. You don't have to see how it was done, just that it was done, what the result is.

08:51 Here, we have the result. We have the products. We have looked at that. There's been expert testimony about that.

08:51 Increasing data throughput of the serial channels by providing each channel with multiple differential signal line pairs. Again, what is required here is that each channel with multiple

08:52 differential signal line pairs, that is determined by
08:52 the product.

08:52 Likewise, configuring the interface
08:52 controller to adapt to a different number of
08:52 differential signal line pairs for conveying the data,
08:52 the address and data bits. Again, that can be
08:52 determined by the type of interface controller on the
08:52 product.

08:52 And then finally, coupling the integrated
08:52 CPU and interface device to a peripheral device
08:52 attached to the motherboard. Again, looking at the
08:52 product, how is -- how has it been configured.

08:52 And so I think to conclude, Your Honor,
08:52 the real issue here seems to be where we got started on
08:52 this is what is the evidence that the product, the
08:52 computer was turned on or the desktops or the laptops
08:52 or the servers were turned on.

08:53 It's the testing step, but that testing
08:53 step only is required -- if we go back to the first
08:53 slide -- is only required by Claim 21. I do think
08:53 there is sufficient evidence to go to the jury on this.

08:53 And even if there were not sufficient
08:53 evidence to go to the jury on this, I want to be
08:53 crystal clear that there's been no testimony that any
08:53 of the other steps would require a device to be turned

on.

And because these are all product-by-process claims, they can be proven through the ultimate result of the -- that is the product and that can be determined and understood via expert testimony.

Thank you, Your Honor.

THE COURT: A response?

MR. LANG: Good morning, Your Honor. Mark Lang on behalf of defendants.

I just want to say that based on the presentation yesterday by Dr. Sarhan, we understood the claims to be -- the method claims to be treated all the same as a method and manufacture, and we didn't see any evidence of how these products are actually manufactured.

We didn't see evidence of testing. We didn't see any evidence of how they're connected or anything like that.

Could we go to the prior slide? I'm sorry.

That's good. Thank you.

And as you can see here, Your Honor, these claims are directed to a method of improving performance of a computer. In order to do that, you

need to actually send data at some point regardless of the claim limitation. You need do that.

And you can see in the connecting limitation, it comprises an LVDS channel comprising two unidirectional serial channels that transmit data in opposite directions. That's where this increase and throughput is coming from. And that needs to be done during the process of manufacturing.

And we have zero evidence that that occurred at any point in time, regardless of whether we're talking about turning products on or off or not.

You also see that in Claim 36 of the '797 patent, it requires increasing data throughput of serial channels. You need to send data to increase throughput. There has to be data sent in order to determine that throughput has been increased.

And I think I'll just leave it at that, Your Honor.

THE COURT: Anything else from the plaintiff?

MR. TAMKIN: Yes, Your Honor. Just a brief response to that last argument, which is -- sorry -- a brief response to that last argument, which is that the preambles have never been interpreted as limiting. And I think this is a new claim

construction, which is effectively you have to make the product run.

This is -- think of like a drug product. And a lot of these cases are in the drug context, which is, does the drug -- manufacture drug to do X, and it's what it does is the results, sure. But that's not the limiting factor.

It's what is this product? What does it consist of?

And here, we know what the product consists of. Those -- it is capable of doing the preamble, but that preamble has never been interpreted as limiting. So that seems to be a new claim construction. I don't know if it is or it isn't.

In any event, the products, our product by process, there has been an incredible amount of testimony about how they are constructed and what they're made of, and as a result, I think the directed verdict should be denied.

(Off-the-record bench conference.)

THE COURT: The Court is going to grant the motion -- Rule 50 motion. So the question then is what to do with the present -- how the damages were presented.

Has the plaintiff gotten with their

damages expert and figured out how the damage expert put on the case with respect to whether or not we can adequately cabin off the damages for the method claims?

MR. TAMKIN: Yes, Your Honor. There was actually a presentation towards the end of the damages expert's presentation where if the claims are only the apparatus claims, it would be from the date of the notice letter forward, and there was an actual number that was provided.

THE COURT: Okay. We'll go with that then.

Then also, I was thinking about the case this morning. When we have our charge conference, we'll need to take up an issue of whether or not we need to have a specific question on the impact of the letter with the jury, whether or not the jury -- I don't think I've ever done this before, but the letter is what the letter is. But you all are taking dramatically different positions on whether or not the letter provided notice to the defendant and when that was.

And so I think that would be best resolved by having the question answered by the jury as to what they think.

That was clearly what the -- and I'm not

08:59 criticizing. I'm -- the plaintiff clearly put on a case trying to establish that that letter provided adequate notice.

08:59 The thrust of the -- I think -- I never know what to call it. It's not really a cross when you call the other side's witnesses, but it's not really a direct.

08:59 So whatever it was Ms. Amstutz did with the two witnesses from the defendant, whether that's a cross out of order or direct, that -- clearly the point of that was to establish some of the issues with regard to the letter as well.

08:59 So you all be thinking about how we would ask the jury the question of whether or not the letter was sufficient to put the defendant on notice of the patent infringement, and then I think we should condition answers based on whether that's a yes or no.

09:00 Because I think it matters, especially for the damages issues, of whether they answer yes or no with respect to whether or not the plaintiff gave sufficient notice in that letter.

09:00 Now, if I'm crazy about that, let me know. I mean, if both sides don't want it, I'm not going to force you all to do it. But that's what makes sense to me.

09:00 So be thinking about that when we come to the charge conference, about whether or not -- it seems to me that -- having listened to the arguments for directed verdict, that the only way a directed verdict would not be granted is if there's a fact issue over whether or not that letter was adequate.

09:00 And if there is a fact issue, then I think the jury has to decide it and not me by denying or granting a motion for directed verdict. I don't think I should be the one determining the adequacy of -- or the sufficiency of a letter to put the defendant on notice.

09:01 I think -- I'm babbling. I know. But I think from the plaintiff's perspective, to survive a motion for directed verdict, they only survive if the argument is that they -- there was -- that a jury could find that it was adequate notice.

09:01 But I don't want to be the one ruling on that in either direction by not having them decide it. So that's why -- again, if both sides don't want to do it, I won't do it. But let me know.

09:01 Maybe you all think it's better for your case to not have them decide it. And if both sides don't want it, there's no appeal and I won't beat my head against the wall.

So -- but I'm thinking of doing this only because I think it's better for you all, but if neither side wants it, then it's not better for you all. That's the way it works, I guess.

So is there anything else that we need to take up?

MR. TAMKIN: On the -- I understand the Court's ruling on the directed verdict, obviously.

Is the Court going to provide any -- any written ruling or other clarification as to the basis for --

THE COURT: We will, but it won't be today. Yeah. We will -- we'll do something in writing.

MR. TAMKIN: Okay. Thank you.

THE COURT: Now -- and also, if you want to -- why don't we do this? It will be too late, but it'll help us. Why don't you all submit something in writing supporting your case, and the defendant can respond. And at least that will give us something to work off of with respect to giving a written order.

We would have -- for example, you saw the cases. The defendant might want to cite cases. It probably would be best for us to have -- for a written order for us to have something to work with.

And so is there anything else we need to take up?

MS. AMSTUTZ: Your Honor, I have one exhibit housekeeping matter. P-82 was referenced in the deposition of Jaime Morquecho. Plaintiff would move to admit P-82.

MR. BURESH: And, Your Honor, not the next witness, but when Dr. --

THE COURT: I need a response to whether you care about the exhibit.

MR. BURESH: What was it? I'm sorry.

MS. AMSTUTZ: P-82 was referenced in Mr. Morquecho's deposition.

MR. BURESH: No objection, Your Honor.

THE COURT: Okay.

MS. AMSTUTZ: Thank you, Your Honor.

THE COURT: Okay. Yes, sir.

MR. BURESH: Not the next witness, but Dr. Edwards, the technical expert. He will be testifying, and his slides do still have some of the claims that the Court has addressed via Rule 50.

We will intend to pursue invalidity as to all claims that have been asserted in the case.

THE COURT: Did you file a counterclaim for invalidity?

09:04 MR. BURESH: We did.
09:04 THE COURT: Anything else?
09:04 MR. TAMKIN: I think we have some disputes with respect to the -- is it Mr. Newell?
09:04 We haven't taken up Edwards either.
09:04 There's two experts, not the next witness, but they're the witnesses -- the two after that where we have some disputes with respect to demonstratives.
09:04 THE COURT: I'm happy to take those up right now.
09:04 MR. TAMKIN: Okay.
09:04 MS. HEPLER: Vicki, could you please pull up the Newell slides? Slide 6, please?
09:04 Your Honor, this first one, plaintiff objects to the language: Mr. Lewis takes economic credit for work not done.
09:05 THE COURT: If you'll just hand me the slides, I'll...
09:05 MS. HEPLER: I'll hand you the ones at issue.
09:05 So plaintiff takes issue with: Mr. Lewis takes economic credit for work not done by plaintiff. This is contrary to his testimony presented yesterday. Mr. Lewis actually explicitly said he understands that

09:05 Dr. Chu --
09:05 THE COURT: I'm going to overrule that.
09:05 I'm going to overrule the second one --
09:05 MS. HEPLER: 5 and 6 have the same
09:05 problem, so we can just move right on to the third one,
09:05 No. 29.
09:05 Vicki, could you go to 29, please?
09:05 And I don't know if y'all have updated
09:05 the slides since you haven't sent us --
09:05 THE COURT: I'm going to overrule that
09:05 one as well.
09:05 Anything else?
09:05 MR. BURESH: Your Honor, I need to --
09:05 THE COURT: And just for the record, the
09:05 slides I've overruled the objections on are Slide 5,
09:06 Slide 6, and Slide 29.
09:06 MS. HEPLER: And just, Your Honor, just
09:06 one second. The objection on Slide 29 is to the
09:06 language "real world."
09:06 Defendants are presenting Mr. Newell's
09:06 opinions as real world and labeling the slides as real
09:06 world.
09:06 THE COURT: I read that, and I'm
09:06 overruling the objection.
09:06 MS. HEPLER: Thank you very much.

09:06 THE COURT: That's why we have cross.
09:06 MR. BURESH: Your Honor, I need to correct the record. I just said that we did have a counterclaim and that is not correct. We only had affirmative defenses as to invalidity. So I assume you'll want me to remove slides that relate --
09:06 THE COURT: I would.
09:06 MR. BURESH: Okay. Can we -- we will try our best to do that at the morning break, but if I need a little more time to make slide adjustments --
09:06 THE COURT: Just let me know.
09:06 MR. BURESH: Thank you, Your Honor.
09:06 THE COURT: Yeah. I only -- and that will come up with regard to the jury charge as well. If you didn't have counterclaims for invalidity, then I will -- then if the jury were to find the patents not infringed, they won't answer the question on validity, so, you know.
09:07 Anything else?
09:07 MR. TAMKIN: There's some on Edwards as well?
09:07 (Conference between counsel.)
09:07 THE COURT: And thank you for letting me know that. I wish more lawyers would just say, I made a mistake. And, you know, it's -- we all do, so...

09:07 MR. TAMKIN: Your Honor, how are we going to -- how are you going to instruct the jury with respect to the directed verdict on the claims?

09:07 THE COURT: I'm not.

09:07 MR. TAMKIN: Okay.

09:07 THE COURT: I'm not going to mention it, so...

09:07 I think you can just argue what's left in the case. Unless you -- if someone wants me to say something, I can. You all think about it --

09:07 MR. TAMKIN: If we can come back to you maybe at the lunch break or -- because I -- if we're now going to be asking for a different damages amount, there has to be some explanation to that, I would think.

09:08 THE COURT: I think I would be happy to say something very neutral like, you know, the Court has made some -- a ruling. And as a result of the ruling, the amount that we're now seeking is X.

09:08 MR. TAMKIN: Okay.

09:08 THE COURT: I don't think that would be -- I'd be happy to do that.

09:08 MR. TAMKIN: Okay. We'll come back to Your Honor. We don't have to do that right now.

09:08 THE COURT: I would want to do it

09:08 whatever way was the most neutral that I could, obviously. That's -- my goal is to do it -- to be neutral. If saying something is more neutral than not saying something, then I would say something.

09:08 MR. TAMKIN: Thank you.

09:08 THE BAILIFF: All rise.

09:08 (Recess taken.)

09:12 THE BAILIFF: All rise.

09:12 THE COURT: Please remain standing for the jury.

09:12 (Jury entered the courtroom.)

09:12 THE COURT: Thank you. You may be seated.

09:12 Counsel?

09:13 MS. MARRIOTT: The defense calls Mr. Ajay Bhatt.

09:13 (The witness was sworn.)

09:13 DIRECT EXAMINATION

09:13 BY MS. MARRIOTT:

09:14 Q. Good morning.

09:14 Would you please introduce yourself to the jury and tell us a little bit about yourself?

09:14 A. Sure. My name is Ajay Bhatt. I'm retired chief engineer --

09:14 (Clarification by Reporter.)

A. Let me start again.

My name is -- good morning. My name is Ajay Bhatt. I'm a retired engineer from Intel Corporation. I live out of Portland, Oregon with my wife of 40 years. And we have one daughter.

Q. Could you give us a little background on your early history prior to coming to the United States?

A. I was born and brought up in India. My dad was a professor, so we lived on campus of a university. I graduated out of college in India, got my master's in electronics prior to coming to United States for higher studies.

Q. How did you end up coming to the United States?

A. Oh, that's a interesting story. Back in India, we had a textbook by a renowned professor out of a university in New York, and I contacted him. I got accepted as a research assistant under him. So I joined City University of New York to work under him and also pursue my higher studies.

Q. Why were you interested in that particular professor?

A. The book that he wrote really got me interested in electronics. Otherwise, I come from family of artists and I'm the first engineer. And so I

was so inspired by reading the book, and I got so interested that I wanted to pursue engineering.

Q. What degree did you obtain from City University in New York?

A. I got a master's in electrical engineering.

Q. And you mentioned that you were formerly at Intel.

When did you join Intel?

A. I joined Intel in 1990.

Q. How long did you work there?

A. I worked there for 26 years.

Q. And over those 26 years, what was your role or your focus?

A. I had two major roles. I was a platform architect and chief I/O engineer.

Q. What does a platform architect do?

A. Platform architect, actually just like building architect, looks at entire computer platform. All -- you know, architect looks at all different subsystems.

And the job is to look at existing platform, anticipate future needs, and balance the platform such that computer -- all subsystems in the computer are balanced. They work nicely. You don't want an engine that is much more powerful than wheels or the body.

09:17 So a computer engineer also makes sure that all the subsystems in the computer are well balanced.
09:17 Q. Now, you also mentioned that you are an I/O architect.
09:18 Could you tell us what that means?
09:18 A. So I/O is an important part of computer system. I/O means input/output. In a simple -- this is how we interact with computers. So a keyboard is an input device, or a mouse is an input device. Whereas, a display is an output device, or a printer would be an output device.
09:18 Q. Are there any industry standards that concern I/O technology?
09:18 A. When it comes to I/O, most of the time there are industry standards or, you know, there are agreed-upon standards that everybody follows. So yes.
09:18 Q. Okay. And how many industry standards have you personally participated in?
09:18 A. In my 40 years of involvement in technologies, I've done at least five or six standards.
09:18 Q. How many of those five or six standards have you served as the chief architect for the standard?
09:19 A. So I led three very well-known and very successful I/O standards.
09:19 Q. And what are those?

A. So USB is universal serial bus. Another one was AGP. That was for bringing very high-resolution graphics. And third was PCI Express. That is a main standard for input/output inside the computers.

Q. Mr. Bhatt, why did you agree to come testify in court today?

A. The -- you know, the -- the technologies that are in dispute are the ones that I actually envisioned first. I was the guy who started these technologies before anybody else. I worked with industry and got them through.

So I have information that very few people in the world have, and I thought everybody would benefit by the historical knowledge that I have and how these things came about.

Q. Are you getting paid for your time that you're spending in this case?

A. Yes. I'm being compensated for this.

Q. Does that fact impact your testimony in any way?

A. No. I'm simply driven by the truth.

Q. And does your compensation in the case depend in any way on the outcome of this case?

A. Not at all.

Q. Overall -- I want to talk about the I/O

09:20 standards that we were just discussing.
09:20 Overall, about how many years did you work on
09:20 developing these standards of technology?
09:20 A. I have been involved in developing standards
09:20 since early 1990s, till I retired.
09:20 Q. And about --
09:20 A. 2016.
09:20 Q. And about how long -- about how many years
09:21 were you working on developing input/output technology
09:21 generally?
09:21 A. All throughout that time, for a significant
09:21 period of time I spent looking at input/output.
09:21 Q. Do you have any patents?
09:21 A. I have about 132 patents, both U.S. and
09:21 international patents, on some of these technologies.
09:21 Q. Now, you mentioned one of the standards that
09:21 you worked on was USB, correct?
09:21 A. Yes.
09:21 Q. Okay. Let's talk about that one first.
09:21 MS. MARRIOTT: If we can go to the next
09:21 slide. Thank you.
BY MS. MARRIOTT:
09:21 Q. Did you bring some slides to prepare or to
09:21 share with the jury today?
09:21 A. We have some slides that would make this

09:21 conversation easy.

09:21 Q. Okay.

09:21 MS. MARRIOTT: Okay. If we go to that second slide. Thank you.

09:21 BY MS. MARRIOTT:

09:21 Q. Okay. Let's talk about USB.

09:21 So what does USB stand for, those letters?

09:21 A. So, you know, the acronym USB really stands for universal serial bus.

09:22 Q. The first word is universal.

09:22 What do you mean by that?

09:22 A. Universal, everybody sees this -- in this picture on the left-hand side, you have a variety of different connectors that are -- that have different shapes and sizes.

09:22 So that's how the computer used to have I/O prior to advent of USB. So USB is the connector on the right-hand side. It is one standardized connector that supports functionality that was supported by all these different functions.

09:22 Q. And what was your involvement in USB?

09:22 A. I was the one who identified the need and proposed this technology to my company and eventually to the industry.

09:23 Q. How did you come up with the idea for USB?

A. They say necessity is mother of invention. So in my case, my wife and daughter, they're nontechnical people. They just wanted to use computer and print a document for my daughter. And they kept on struggling with that. And my wife got so frustrated.

And she says, why do we have this junk that doesn't work when we need it?

So I thought about it. And I said, you know, if a common person like them is struggling with using computer which is very powerful and has a lot of functionality, and they couldn't use it. And that means millions of people who want to use computers, who can't use it. So I thought there's got to be a better way of doing it.

So at Intel, we were involved in defining future computers, and I said, if Intel wants to grow the business and help new class of users who are not very technical, then we needed to invest in something like USB. And that's where USB began.

Q. How widespread is the use of USB today?

A. Oh, USB is everywhere. It is in places that I never thought it would exist. You know, on the plane by my seat, you know, it's on every computer and every phone. It's just ubiquitous.

Q. When your team was developing USB, was it a

09:24 proprietary technology to Intel or was it open?
09:24 A. We always thought that it was such an important technology that it must be broadly available, and, hence, we should not charge any royalty. We should just create an open standard, give the know-how to the industry and let everybody innovate around it.
09:25 Q. Is there any sort of a fee at all to join the USB standards organization?
09:25 A. So when we develop technology -- so the technology is free, but this technology is administered by a nonprofit organization, and they charge fee just to be a member.
09:25 And by being a member, you get a bunch of privileges. You get whole bunch of, you know, invitations to the conferences. You get specification. You need help, there's compliance if you want to go test your part. So they -- it's for their operational expenses. But it's very nominal.
09:25 Q. Is there a royalty, though, for companies --
09:25 A. Absolutely no royalty. People are free to adopt the technology and build products.
09:26 Q. And what would you say is the benefit of a standard being open in the way that you just described?
09:26 A. When you create an open standard, it unleashes innovation and creativity. Because, you know, you got

foundational technology. Using USB, you can see all sorts of devices that I never thought would exist.

So the open standard has tapped into imagination of very creative engineers and users all throughout the world, and that's the beauty of open standards.

Q. Now, as an open standard, were there more than just engineers and employees at Intel working on the development of USB?

A. So even though technology was conceived and initially developed at Intel, it has been a collaborative effort, and to this day, after about 20-plus years of introduction of this technology, it continues to be a collaborative effort by some of the industry's smartest people, I would say.

Q. What were some of the companies that were working with Intel to develop USB?

A. So back then, so the prominent companies were IBM, Digital Equipment Corporation, Microsoft, Compaq Computers, they're HP now, Northern Telecom.

So sort of leading computer and communications companies of the time engaged with us in developing this standard.

Q. Did all of those companies that worked with Intel to develop the USB standard, did they all agree

that the standard should be open?

A. Yeah. There was the -- there was the understanding at -- from the beginning that standards should always be open.

Q. Let's talk about timing, the time frame, okay?

When did the development for the initial version of USB start?

A. Initially, I started kicking around this idea in 1992 briefly after joining Intel. And it took us a few years and multiple rounds before we had a specification. So it was about three years or so.

Q. So when was the first specification released?

A. First specification was substantially done in 1995 and published in 1996.

Q. Okay. So four or five years to get this specification out?

A. Yes. You know, technology such as USB does take time. So usually three to four years, I would say.

Q. How difficult was that process of development over that four-year period?

A. Oh, it was one of the most exciting as well as most challenging thing to do. Because when you bring very creative people from all over the world, you get different opinions. You have to consider each input

09:29 that they have very carefully, leverage the best idea,
09:29 and discount the ideas that don't apply.
09:29 So, you know, these things are full of ups and
09:29 downs. There are days when you come home and you feel
09:29 like, you know, this project is dead. You've hit the
09:29 roadblock, and you just can't go forward.
09:29 And then you sleep on it, you think about it,
09:29 you go back, try and move on. So it was very exciting
09:29 time but in the end, quite satisfactory.
09:29 Q. Okay.
09:29 MS. MARRIOTT: Okay. Can we pull up
09:30 Joint Exhibit 50?
09:30 Thank you.
09:30 BY MS. MARRIOTT:
09:30 Q. Now, this is Joint Exhibit 50, Mr. Bhatt.
09:30 Do you recognize this document?
09:30 A. Yes. I do.
09:30 Q. Okay. And what is it?
09:30 A. This is the very first version of the spec
09:30 that we wrote.
09:30 Q. For USB?
09:30 A. For the USB.
09:30 MS. MARRIOTT: Okay. We move to admit
09:30 Joint Exhibit 50.
09:30 MR. TAMKIN: No objection.

THE COURT: Admitted.

MS. MARRIOTT: If we could publish that to the jury. We'll just give that a second.

BY MS. MARRIOTT:

Q. Okay. Could you describe -- now that the jury can see the document, can you describe for them what this document is?

A. Yeah. This is very first version of the specification that describes the technology and all necessary details so that a developer can take this spec and develop a product.

Q. And what's the date on this first version of USB?

A. This is January 15, 1996.

Q. Now, this document is, by my count, 268 pages.

Does that sound right?

A. Yeah. It was quite a comprehensive document.

Q. Why was it so long?

A. Well, you know, this document was made available to all the developers who wanted to develop new products. And so this would be the starting point for somebody who doesn't know the technology to start with the documentation, study it, understand all the requirements of developing the technology and start doing detailed development.

So to do a development, you need all the necessary technical details, and this is the comprehensive document that provides those details to build a product.

MS. MARRIOTT: Now, if we can go back to the slides.

BY MS. MARRIOTT:

Q. Now, on this slide, Mr. Bhatt, what type of connector do we have on the left-hand side where it says Parallel Connector?

A. So as the title says, it is a parallel connector. So back then, this is before the USB, they had this very big and bulky connector that connected to a printer.

Q. And so this parallel connector, that's what existed prior to the development of USB?

A. Yes.

Q. Okay. When it says parallel connector, at a high level, what does -- what does "parallel" mean?

A. That's -- the word says "parallel." So imagine, you know, you're in a multilane highway and it has multiple lanes and cars go in individual lanes. So similar to computers, bits of information is sent in parallel. So it's -- it's sent simultaneously over the wires and the connectors.

09:33 Q. Now, on the right-hand side, we have universal serial bus, which has serial in the title.

What does that mean?

A. So the one on the right-hand side is very small connector. Means it has much -- many -- it only has few wires, particularly, only four wires. So it has significantly smaller footprint or smaller size.

Here, you have to send lot more information. So there is a technique called "serially." So you send bits in sequence, and that's why it is called serial.

09:34 Q. Why did you choose serial for USB?

A. Because, you know, the computers were going from the desktop to the laptop, and they were getting smaller and smaller. So we needed a smaller connector.

Imagine, you know, your phone. You couldn't use a connector on the left-hand side. You needed a miniature version that had same or more functionality, and that's the one on the right-hand side.

Q. And serial communication that you're talking about, how is the data communicated?

A. Data is sent serially. So it is sent in sequence.

Q. And what is the name of the type of signaling that USB used?

A. So at that time, we chose a signaling called

differential signaling.

Q. And how long has differential signaling been around?

A. Oh, differential signaling has been around more than 50 years or more. I mean, just one of the more -- you know, it was one of the standard signaling technologies.

Q. And how long has USB been using differential signaling?

A. USB was designed to use differential signaling from Day 1.

Q. How has USB evolved over time?

A. Oh, the evolution of USB is quite interesting. We started at a really low speed. And 20 years later, it is -- so we started at actually 1.5 million bits per second. Today, it is going at 40 billion bits per second. It's a tremendous amount of speed.

Q. Did USB, that evolution you just described, did it evolve in a compatible way?

A. Yes. So the beauty of USB is that, you know, the device that -- so yes. The answer is compatible. Yes. It is compatible.

That means anything that was done on Day 1 should work now. And if you take today's origin and plug it in, at least it would work like an old system.

09:36 MS. MARRIOTT: Now, if we can go to the next slide.

09:36 Thank you.

09:36 BY MS. MARRIOTT:

09:36 Q. Let's talk about the -- what's in a USB cable.

09:36 Could you just describe for the jury, what's inside of this USB cable --

09:36 A. Yeah. So this is the cable and a connector, which is cut at one end. It's dissected so that you can see what's inside.

09:36 So you see that there are two wires that are labeled D+ and D-. So these are the wires through which you send information between computer and your phone or your printer.

09:37 The other two wires, that's a ground and Vcc. They're the wires for charging. That's how you charge your phone. Or, you know, USB allows you to charge your devices. So that's where you send power information.

09:37 So basically, you send communication information or the data and power through the -- sort of charge through this kind.

09:37 Q. Okay.

09:37 MS. MARRIOTT: If we could go to the next slide.

09:37 BY MS. MARRIOTT:
09:37 Q. What do those wires that you just described, what do they connect to?
09:37 A. They connect to a mating connector that is usually found -- the one on the right-hand side is found on your computer.
09:37 Q. Do they connect to pins?
09:37 A. Yeah. So that receptacle also has corresponding pins that mate with pins on your cable.
09:37 Q. And what is a pin?
09:37 A. A pin is -- basically, it makes a connection. It's just like your, you know, plug, electrical plug that we plug in and it passes electricity. Similarly, when you make these connectors, the communication information or the data and power are sent.
09:38 Q. Now, on this particular slide, where are the pins depicted?
09:38 A. So the pins are depicted -- you know, there are these arrows that are going up, Vcc, D-, D+, and ground. So the pins are inside the connector.
09:38 Q. Is it --
09:38 MS. MARRIOTT: If we can go to the next slide.
09:38 BY MS. MARRIOTT:
09:38 Q. Is it important to have the same pin layout on

09:38 a USB port, shown on the right, as you do in the USB connector that's on the left?

09:38 A. Of course. Otherwise, things wouldn't work.

Q. Okay.

09:38 MS. MARRIOTT: If we can look at J-47, Joint Exhibit 47. I believe it's already been admitted.

09:38 Thank you.

09:38 BY MS. MARRIOTT:

09:39 Q. Mr. Bhatt, do you recognize what's on the screen, J-47?

09:39 A. Yes. This is a later version of the specification. It's the third evolution of the USB.

09:39 Q. And what's the date on this document?

09:39 A. The date is November 12th, 2008.

09:39 Q. And this is the USB 3 specification?

09:39 A. 3.0. Yes.

09:39 Q. Okay. So USB 3 came out after USB 2, correct?

09:39 A. Yes.

09:39 Q. Now, you were just talking about the way the different versions work together.

09:39 Is USB 3 backwards compatible with USB 2?

09:39 A. Yes. It is.

09:39 Q. And what does that mean?

09:39 A. It means that -- say you have a computer that

has a USB 3 port, which has more capability than the earlier version.

But when -- and if you bought a mouse -- computer mouse that you bought in early 2000 and it's just sitting around in your home and you want to use it, you can simply use it without any changes.

Q. So if I have a computer, one of the -- this is the computer that's at issue in the case -- and it has a USB 3 port, right here on the side, if I plug a USB 2 mouse in it --

MR. TAMKIN: Object, Your Honor. May I approach?

THE COURT: Sure.

(Bench conference.)

MR. TAMKIN: We're starting to get into claim terms and claim issues. Your Honor specifically ruled that you're not going to allow Mr. Bhatt to talk about backwards compatibility because that's an issue in the claim and whether or not X is backwards with Y.

He did it in the context of PCI Express. I -- so I think --

THE COURT: What I heard him saying was how this worked -- how it works.

MS. MARRIOTT: In the context of USB, not PCI Express.

MR. TAMKIN: In the context of USB, it's going to be the same issue. Is it backwards compatible or not?

And it's how it works. But if it's backwards compatible, and now she's holding up the accused product and saying, so is this going to have backwards compatibility? That's when we're starting to get into claim terms and claim issues.

I agree it's going to go more with PCI Express, but it's starting to come up now, which is why I wanted to flag it right now and object to specifically questions about whether the accused product has backwards compatibility because it relates to all of these standards.

MS. MARRIOTT: We're talking about the functionality of USB, and there's no claim term.

THE COURT: I agree. I'm going to overrule the objection.

MS. MARRIOTT: Thank you.

(Bench conference concludes.)

BY MS. MARRIOTT:

Q. Mr. Bhatt, okay. So I just kind of want to pick up where we left off. This is the accused product in this case, and it has the three USB 3 ports, right?

If I plug a mouse that has a USB 2 connector

in it, will it work?

A. Yes. It will because it's compatible.

Q. Thank you.

MS. MARRIOTT: Okay. If we can go back to the slides, please.

BY MS. MARRIOTT:

Q. Mr. Bhatt, what are we seeing here on this slide?

A. So this is a depiction of USB connector and a port.

MS. MARRIOTT: Can we go to the next slide, please?

Thank you.

BY MS. MARRIOTT:

Q. Okay. And on this slide, we have on the right a USB 3 port; is that correct?

A. Yes.

Q. Okay. What allows a USB 2 connector, such as in the mouse, to work with a USB 3 port like what was in the computer we just looked at?

A. So the -- as you can see, the USB 3 port has some additional pins in, you know, the connector. They're not labeled in this picture, but if you pay attention to it, there are about five additional pins that are placed there where the arrow is.

Q. Does the USB 3 port on the right have the original USB 2 bus in it as well?
A. Yes. So the newer port preserved the original four pins as well.
Q. Is it possible for USB 2 to maintain compatibility with USB 3 without including that original USB 2 bus?
A. No. You couldn't, because then you wouldn't make any connection there. If you took the old device and those pins are missing, no connection would be made.
MS. MARRIOTT: If we go to the next slide.
BY MS. MARRIOTT:
Q. Now, USB 3 added some new capabilities, correct?
A. Yes.
Q. How did you add the new capabilities for USB 3 while still being compatible with USB 2?
A. So in this case, you know, we utilized new pins to run improved version of USB, a newer version of USB called USB 3 to those pins. So the original USB continue to work on original pins, and then we added newer pins. It's like defining a subset/superset.
Q. And can we see the new USB 3 pins in the

depiction on the right?
A. So the red arrow really shows you those new pins.
Q. Okay. When I plug a USB 3 cable into a USB 3 port, which pins are used?
A. In that case, you would use the new pins.
Q. Why did you need to add a second bus here? Why couldn't you just make USB 2 faster?
A. Well, so with USB 1 -- with USB 2, we ran it as fast as we could with USB 1 pins. But at -- by early -- I mean, in 2000s, before we define USB 3, we couldn't extend it anymore.
It was just the limitations of physics. You could run that bus faster, the original one. So you had to create a companion one. So we added some more pins and developed new technology that would work with USB 2.
Q. How much effort went into building USB 3?
A. It was probably about the same as the original one. And sometimes when you try to extend something that has existed in hundreds of millions of machines, it's even more challenging. Because you can't disrupt what you have and you have to now add something more that would last for even longer than originally.
Q. Over time, did USB accomplish your original

goal?

A. Oh, it has far exceeded any of the expectations I had. I thought USB would last for probably couple of years. I'm surprised that it has lasted more than 20 years.

Q. Now, did you secure any patents on USB technology?

A. Yes. I've had -- I have number of patents that were granted to me and my team for work on USB.

Q. How does the fact that there are patents granted on USB relate to the fact that USB is an open standard?

A. If you want to create an open standard, you have to have patents because you can't give away something that you don't own. So when you have a patent, now it's -- you know, it's assigned to you and your company. So you can decide how to open it up, when to open it up, or if to open it up.

Q. Okay. Now, we've been talking about the external ports, USB on a computer. I want to switch gears and talk about the internal communication within a computer.

This is a slide, and at the top it says Internal Communication Standards.

What does "internal" mean in this context?

A. So, you know, when you open up a computer, just internally there you'll see a bunch of chips or components, and they have to talk to each other.

In this case, internal to the computer, there are I/Os and there's some internal standards. They're utilized for communications within those components, and that's why it is called internal communication standards. Your normal user usually doesn't see them.

Q. Okay. So if we're looking at this laptop, can we see those internal components that you're talking about?

A. Not here, unless you open it up.

Q. Open up the back panel?

A. Yes.

Q. Does this slide relate to the history of the development of these internal communication interface --

A. Yeah. This is a very high-level view. This is the way to sort of explain technologies, you know, major technologies and I/O here.

Q. What is the 1st Generation here of internal communication standards?

A. So the first one is, you know, known as ISA. So at IBM in '80s, when they first defined IBM PC -- this is when the PC revolution started -- they had

internal interconnects for internal interface. That's the word computer architects use. So that -- they used a technology called ISA. So -- anyway.

Q. And what's the 2nd Generation?

A. So that technology lasted for about ten years, and it couldn't be extended any more. By this time processors and capabilities had grown tremendously, and ISA was not good enough and we needed something faster.

And that's when we started thinking what PCI local bus to sort of -- it was sort of looking forward. By anticipating our future needs, we defined a interconnect.

Q. And PCI local bus was in the 1990s?

A. Yeah. Right after I joined Intel in '90s, we started talking about extending internal communication.

Q. Okay. And then what's the 3rd Generation?

A. So, you know, just like ISA, PCI did its job for about ten years, and it started becoming a major bottleneck. Physics was a problem. You couldn't extend the technology any further. And we needed something completely new. And we had to go in a different direction, and as a result, we came up with this proposal for PCI Express.

Q. At the bottom here, it says: Generational technology changes.

09:50 What are you describing there?
09:50 A. So generational technologies means you introduce discontinuity. You basically obsolete what you have and throw out everything and start fresh again. So it's a major inflection point or change in technology.
09:51 And if I could just add one more sentence for why, it's just you can't extend things any further. It's just too difficult.
09:51 Q. What was your role on the development of PCI Express?
09:51 A. So again, just like USB, my senior management trusted me to propose this technology, and I did propose this technology. So just like USB, I observed the bottleneck, formed a team, and got the technology developed.
09:51 Q. What technology did PCI Express replace?
09:51 A. It replaced PCI local bus.
09:51 Q. Okay. Now, on the slide before us, we have a diagram.
09:51 And at a really high level, can you just explain what this is depicting? And then we'll walk through it.
09:52 A. Yes. So this is a very simplified plot diagram, as they call it, a very high level plot

09:52 diagram of a computer system.

09:52 Q. And is it depicting the PCI local bus architecture?

09:52 A. You know, so right in the middle, you know, you see the label that says PCI local bus. So everything in that color, orange or so, is associated with PCI local bus.

09:52 Q. In this diagram, what is the main -- what is the processor in this diagram?

09:52 A. So the processor, you see that -- at the top you called it -- it says Intel Pentium. So that's a central processor unit. That's sort of the brain of the computer.

09:52 Q. Okay. And underneath that, we see the words "north bridge."

09:52 What is that?

09:52 A. So north bridge is one of the components, a very essential component for PCI local bus that takes input from CPU in one form and translates that to signals that are required by PCI local bus. So it's really a translator of CPU instructions to the PCI-compliant, you know, transfers.

09:53 Q. Okay. And at the bottom of this diagram, there's a box that says "south bridge."

09:53 What is that?

A. So that is also -- usually south bridge is another component in the system that has -- it has a number of subsystems inside, and it interfaces to the PCI local bus. And it acts as a bridge between PCI local bus and, you know, USB controller, your network controller, your hard drive.

So it again translates from PCI local bus transactions into something that your output devices can use.

Q. And you've mentioned PCI local bus.

What is that at a high level?

A. PCI local bus is sort of your main highway, if you would, that -- it's a parallel bus or an interconnect where each of the devices can talk to it. So your graphics, your south bridge, your add-in cards, everything talks to each other via that interconnect.

Q. And on this PCI local bus on the right, it says: PCI local bus slots.

What are those?

A. So certain things are -- you know, when you buy a computer, there are certain things that are already built in, but if you wanted to customize it. And this is mainly true for your desktop computer. If you want to change the graphics controller or a network card, after you bought the computer, you can buy a card

09:55 and plug it in.

09:55 Q. Now, the jury throughout this trial has heard the terms "PCI configurations," "software model."

09:55 Can you describe what that means?

09:55 A. Yeah. So, you know, when IBM first developed -- historical perspective would help, I think.

09:55 So when IBM first developed the computer, there was no way for software to know what hardware was there, and there was no way for hardware to know what software was there.

09:55 So some smart computer guy would have to know the right version of the hardware and the software and make sure everything was loaded in the computer. And that's what created a lot of headaches for users. You need an IT guy to fix this thing.

09:55 So when we were doing USB and even PCI local bus, we thought that it would be nice to develop a technology that would automatically configure the computer. That means any information that needs to be sent from hardware to software is sent, and any information that software needs to know is available from hardware.

09:56 So that's what is called software model because all it means is that a computer manufacturer

09:56 would configure the system, and they would put all this
09:56 information that software needs to know in one place.
09:56 It's called config space.

09:56 It's like you have a home address. You build
09:56 a home. And then you put a house number. And now you
09:56 have a street address and ZIP code and all those things
09:56 associated with that address.

09:56 So configuration space is something like that.
09:56 Each device of a computer has a unique set of
09:56 information associated with it because -- and no
09:56 device -- two devices can have the same address.
09:57 Otherwise, you know, information ends up in the wrong
09:57 place and you have chaos.

09:57 So software model is basically a process of
09:57 assigning some resources in the computer that are
09:57 necessary for computer to function and a way to
09:57 communicate that information to the software so that
09:57 even in software, there are a bunch of building blocks
09:57 that they need to configure.

09:57 So say, for example, you have a graphic
09:57 controller from IBM. So you'd need a corresponding
09:57 software that -- from IBM that can talk to the graphic
09:57 controller. And every subsystem has that.

09:57 So the software model is basically a process.
09:57 And this all happens before you can start using the

computer. You know when your computer boots, all this stuff is done for you. That used to be users' headache. By creating this new technology, we created this software model.

Q. Okay. Let's take it step by step, okay?

In the PCI local bus architecture that we're depicting here, let's say I have a computer and it's up and running. So I turned it on. Okay? And let's say I wanted to use that computer to display graphics on the screen. Okay?

What's the first step in the product for PCI local bus?

A. So say you want to put some picture on the screen. So software instructions are already loaded in a -- inside your computer. It's already ready. The function of processor is to process instructions. There is software. And it creates a CPU transaction for graphics.

So CPU says, please, you know, graphics controller, print this. Do this on the screen.

Q. Okay. At this point, is there any transaction that's created for the PCI local bus?

A. No. So far it's just a CPU that executed instruction and said -- so there's a CPU transaction done on a CPU bus or CPU interface here.

Q. What's the second step?
A. The second step is -- so the north bridge from CPU, it gets this instruction that says, please send something to graphics. So the north bridge is the one in this case that talks to the graphics. So north bridge has to translate the information that it obtained from the CPU in the form that PCI local bus device can understand.
Q. And does the north bridge create that PCI local bus transaction?
A. Exactly. The role of the north bridge is to primarily translate what came from CPU.
Q. Does the operating system in the computer play any part in that process?
A. This is all hardware functionality at this point. Once the CPU generates the transaction, there are waveforms in the system, and it is -- this functionality is offloaded to the hardware.
Q. Okay. What is the third step?
A. So the third step is the way -- so north bridge took the instruction. It says, you know, here's the CPU address and data and control. It takes all those things, and it really translates and broadcasts that information on PCI local bus. Because that's how the PCI local bus works.

All the devices, it's like, you know, you have a street where all the houses are there. An ice cream truck comes in. It starts announcing, hey. Everybody listen. So this -- you know, the information is broadcast.

Q. And what is the fourth step?

A. So the fourth -- so now everybody is listening and they're saying, is this for me? And everybody that is not graphics rejects this thing and says, oh, this is not for me.

But graphics says, oh, you want to put something on the screen, so this must be for me. So it claims that transaction. And it takes appropriate action at that point.

Q. Okay.

MS. MARRIOTT: Permission to approach, Your Honor, with an exhibit.

THE COURT: Sure.

MS. MARRIOTT: Thank you.

BY MS. MARRIOTT:

Q. Now, Mr. Bhatt, I've just handed you what has been marked as Defendants' Exhibit 1422.

Do you know what the components I have just handed you are?

A. Yeah. I do.

Q. And what are they?
A. It is a slot. It is usually found in the motherboard, and this is an add-in card.
Q. And what type of technology is the slot and card?
A. Oh, in looking at the size of the connector, I recognize this. This is a PCI local bus slot and card.
Q. Thank you.
MS. MARRIOTT: We move to admit.
MR. TAMKIN: No objection.
THE COURT: Admitted.
MS. MARRIOTT: Thank you.
BY MS. MARRIOTT:
Q. Now, using those physical components, the PCI local bus slot and card, can you demonstrate to the jury how they interface with each other?
A. Yeah. So this is just a small piece of motherboard. So this is a connector that you would find.
So say that you bought a computer and it had these three slots. Now I bought this card, looks like network card, Ethernet card. That's all. And you got a new card, you open up your box, and you plug this right there.
And then, you know, once you power up the

computer, you're ready to use it.
Q. Are the pins that we see on this particular connector similar to the pins that we saw on the USB connector?
A. No. This is very different technology. USB, everybody knows. Everybody uses it.
Q. But there are pins on it?
A. Yeah. There are pins on it and quite a lot.
Q. And how do the pins in the card relate to the pins in the slot?
A. Oh, there's a 1:1 correspondence. For every pin here, there is correspondence in there.
Q. Okay.
MS. MARRIOTT: Your Honor, would you mind if we pass that for the jury?
THE COURT: Sure.
MS. MARRIOTT: Thank you.
Okay. If we could pull up Joint Exhibit 65, please.
BY MS. MARRIOTT:
Q. Okay. Mr. Bhatt, do you see what's marked as J-65 on your screen?
A. Yes.
Q. Okay. Do you recognize this document?
A. This is a PCI local bus specification, Version

10:04 2.1. It's a later version of original spec.
10:04 Q. Okay.
10:04 MS. MARRIOTT: Move to admit, Your Honor.
10:04 MR. TAMKIN: No objection.
10:04 THE COURT: Admitted.
10:04 MS. MARRIOTT: Okay. If we can publish to the jury, we'll wait for that.
10:04 BY MS. MARRIOTT:
10:04 Q. All right. Now that the jury can see the document, can you describe what this is?
10:04 A. This is a specification that describes all the necessary details of the technology.
10:04 Q. For a PCI local bus?
10:04 A. For the PCI local bus. A very comprehensive document, I must say.
10:04 Q. Okay.
10:04 MS. MARRIOTT: And if we go to the next slide.
BY MS. MARRIOTT:
10:04 Q. On the right-hand side, at the bottom, see how it's labeled Figure 2-1?
10:05 A. Yes.
10:05 Q. Is that from the PCI local bus specification that we've been talking about?
10:05 A. Yes. This is -- this is information from the

spec, I believe.

Q. Okay. And what's depicted on the left-hand side?

A. On the left-hand side, you know, you have this local bus slot that we just passed around.

Q. Okay. Now, what does this figure on the right, this Figure 2-1 from the specification, tell us about the pins in the slot that the jury has right now and that's depicted on the left?

A. So what is depicted here are -- is the information that you need when you populate this connector. So it has all the signals necessary for that connector.

Q. How many pins are required to transmit PCI local bus?

A. So earlier you saw the card that I was using, it must have 47 pins in it. So that card has 47 pins that are required.

Q. And we have here highlighted that they're required pins.

Do you see that on the screen?

A. Yeah.

Q. Why are there required pins?

A. They're required because to do a PCI local bus-compliant transaction, you must have this

functionality, or all the pins, that is supported via those pins.

Q. Would PCI local bus work without -- in the absence of 47 pins?

A. No. You need all the signals to be compliant with PCI local bus spec.

Q. And now in the middle of the slide, it says: PCI-compliant device.

Do you see that?

A. Yes.

Q. What is a PCI-compliant device?

A. PCI-compliant device is a device that is built according to the PCI local bus spec. And once the device is built, the governing body for this specification actually runs compliance.

That means they bring component from ASUS and different companies together. So there -- there's two unknown parties and you put them together, they must function. That way, you know, you as a user, when you buy a component and take it home, or a card, it is promised that it will work.

And that's what compliance means, that once you buy a compliant device, it will work.

Q. Now, of those 47 required PCI local bus pins, how many of them are dedicated to sending and receiving

just the address and data part?

A. So you see the top arrow that says AD zero to 31, they're both address and data. And then there's some control signals that are highlighted here as well.

And associated with that is information for -- when you send information, it must be correct. And there is a signal for that as well.

Q. So how many of those pins are for address and data bits?

A. Address and data are 32.

Q. Okay. And if you don't have those 32 required pins that we've been talking about, can there be address and data in a PCI local bus architecture?

A. I'm sorry. I don't understand the question.

Q. Sure.

If you don't have these 32 pins, can there be address and data bits in a PCI local bus cycle?

A. Yeah. You must have all the address and data bits to send information.

Q. Okay. How would you describe the protocol and the signaling in PCI local bus?

A. Yeah. So PCI local bus was -- has monolithic protocol and signaling. So "protocol" means all the rules that are required to send a transaction, and "signaling" is the physical wires that carry those

signals that function according to the rules.

But they're monolithic, so they're intertwined. Changing one requires changing or can impact other side and vice versa.

Q. Now, on the right here, it's 3.3.2. Is that also from the PCI local bus specification?

A. Yeah. I think this is very simplified diagram for one of the transactions.

Q. Okay. And the title is a Write Transaction?

A. Yes.

Q. What is the write transaction that is depicted on the slide?

A. So the write transaction in computer language is CPU wants to store information. Say you're a disc, or a USB. So when a transaction is sent from CPU side to the disc drive or your USB device, the pin drive, that's called write.

Q. And on this slide, when you -- you've also -- you've already talked about the protocol and signaling are intertwined, but what is protocol?

A. So the protocol, you see -- protocol are the rules for all these required signals to sort of be present in certain state. They have to be -- they have to follow certain guidelines.

There's rules defined in the specification

that says that you have to send this information -- address information at certain time. You have to send data information after you receive certain signal.

So there's sequence of events that are defined in the specification so that information can be correctly, in this case, sent to disc drive.

Q. What is the other part of this? So what's signaling?

A. So the signaling, you see these labels on the left-hand side, like CLK, frame, AD, C/BE, they all correspond to group of signals that are actually present, you know, on the connector or on the motherboard.

So these are the individual signals there, and they go between 0 volt to 5 volts. So they go from low to high. So they change.

It's like you are turning on a switch and light bulb goes on and off. That's how a computer works. Signal goes up and down. So -- and the rules of how they exist in which phase, that's what is depicted in protocol.

Q. How does a PCI local bus cycle illustrate that intertwined nature of the protocol and the signaling?

A. Yeah. So there are strict rules. So at each signal, certain things must happen to the address and

data and the control lines.

If you don't do it -- for example, if you don't deliver the address when you need it, the bus doesn't function. Or if you don't get the data when you want to send it and somebody doesn't take it, it doesn't work. It just malfunctions.

So you must follow rules. It is like on a highway. If people, you know, start violating red lights, then you have collisions and a mess happens.

Q. Now, you mentioned -- you mentioned three generations of internal communications standards.

How big of a decision was it to introduce a new generation to replace PCI?

A. This is very controversial decision when I proposed this. I would say Richter 10 when you look at the earthquake, it's that big. It was just a massive controversy when I proposed this approach.

Q. For PCI Express?

A. For PCI Express.

Q. Okay. How did this impact you personally?

A. Oh, this is -- like I said, it's probably one of the most challenging assignments that I've ever taken. And I've done very challenging things, but this was unlike anything else I had done.

Q. Did you have to convince anyone at Intel to

proceed with the development?

A. I had to convince almost everybody that I was working with because some of the choices that I was making and some of the problems I was highlighting, they were very risky. They were very challenging.

And there was a fair amount of disagreement, I would say, among various business groups within Intel, which had 100,000 people and, you know, billions of dollars of business that was impacted by a major change that I was proposing.

So to say the least, it was very controversial.

Q. Who did you have to make your case to at Intel?

A. When multiple parties are involved and each very powerful and have multibillion-dollar business, you have to go to the top of the chain. And in this case, it was the CEO and the president.

Q. Okay. Now, if we look at the timeline, this is a timeline depicting the development of PCI Express on the top?

A. Yes.

Q. Do you remember when you had this meeting with the CEO/president of Intel?

A. Yes. It was early in December. I think it

was 4th December. Usually you go on a Christmas break. I wanted to get -- if you're going to do this, I wanted blessing from our CEO because he was the tiebreaker vote. And I have to stand in front of him and convince him and his direct report that this is something we should do.

Q. And that was December in 2000?

A. In 2000. Yes.

Q. Can you tell us just a little bit about that meeting?

A. So I went into it. I knew people who build computer servers, they didn't like this idea. People who build some of the laptops, they were quite concerned about what I was proposing. But the desktop guys liked the idea.

So I went in and laid out the picture. I explained to them how this technology work in laptops and desktops and servers and network devices. So I had a very comprehensive picture. And I showed benefits. I also showed them the risks and what -- and how we would mitigate the risk.

Q. Why did you need to go to the president and CEO of Intel to make your case?

A. This was such a big change. We were going to basically remove everything that was there, you know,

with PCI. The proposal was forget about what we had in PCI. It's a new start.

Now, can you imagine, you know, last -- in 1999 we're building this desktop that was using PCI in this graphics card that was sitting on a shelf. Everybody knew how to use it.

Now you go in summer 2000. All of a sudden the PCI slot isn't there anymore, and there's a new slot. And anything new takes time to ramp up. It's not -- nothing happens overnight.

And if -- because there was a new technology, if somebody didn't get it right, that means we could not ship any of our components. Our customers couldn't ship any systems.

And that was a huge economic impact to not only my employer but all industry. And it was that -- because I was really asking them to forget about everything we learned about PCI local bus.

And one last thing. If you wanted to move forward, you had to sort of remove this handcuff that you had and just unshackle yourself and go forward. Luckily, that is exactly what has happened.

Q. Was PCI Express intended to be an open standard, like what we discussed earlier?

A. Yes. From the very beginning, the

understanding was if you're building a highway, don't put a toll booth.

Q. And like USB, the development of USB, did you have to bring others on board with you to help develop the PCI Express technology?

A. Absolutely. This is, again, you know, based on my experience and success with USB. It was a known model to us.

We valued -- we had initial ideas, but we valued input from the rest of the industry. Because when you involve everybody, you have different points of view that are included. And if they buy into the need for it and the requirement for it, then they contribute to success of that.

And that's exactly what we did. It was a very cooperative effort.

Q. What was the level of training or experience of the folks on your team that worked to develop PCI Express?

A. So in this project, rookies need not apply. These were some of the best of the best I found, and the advantage of, you know, getting blessing from your CEO is that you get a choice of the best engineers that Intel had to offer, people who had been around the block a number of times.

And similarly, we got some of the top leaders from the industry. They were leaders in their own right within their own corporation, and they were as influential or more in their own companies, so getting a most influential IBM engineer or HP engineer or Microsoft engineer was a must have.

Q. Now, in this industry working group that you just described, what was the initial name of the technology that you were developing?

A. Yeah. So usually, you know, the way this is developed is before you start out in a big open forum, you collect these -- you know, you have collection of people together from different companies, and you give it a generic name.

So, you know, we're engineers, we don't know how to name things. So we just observed this thing. 1st Generation, second was PCI and its offshoots. So let's just call it a 3rd Generation and abbreviate it by calling it 3GI.

Q. And 3GIO stands for?

A. 3rd Generation I/O. Nothing special.

Q. How long did it take to develop the specification for 3GIO?

A. So, you know, if you count internal investigation, it was much earlier than this 2000 date.

Because before you take up anybody's time, you have to convince yourself and do other experiments. So it was done way before that.

But with industry, we started -- right after I got approval from our CEO in 2000, we started engaging with other industry players.

Q. When was the first PCI Express base specification released?

A. In February of 2002. So a good two years of solid work.

Q. Okay. And it looks like here between February and July of 2002, the name changed from 3GIO to PCI Express; is that correct?

A. Yes.

Q. Why is that?

A. Well, this always happens. So first, we had this small group called Promoter and Key Developer Group. It was -- it was -- you know, we had invited all these people to work with us. And the only understanding was that this is going to be an open standard.

But once the standard is done, you don't want any one company controlling the standard. You want to go to something nonprofit, somebody who knows how to publish a spec, take questions and inquiries, run

compliance for a job. So that body was PCI-SIG which we had formed in order to administer PCI local bus.

Q. So why was the name changed to PCI Express?

A. So the name was changed because, you know, now we're going to this form called PCI-SIG. SIG stands for special interest group. And the word PCI was well known by then.

So the request was the technology is 3GIO, but can we someone get word PCI in? So even though it was completely different, they wanted to get this word in, PCI.

But then the -- by calling it "express," that means a super fast version of it.

He said, fine. It's a good compromise.

Q. Was it just a branding exercise?

A. It is really branding. It's a marketing exercise. The technology is still at 3GI.

Q. Does the fact that PCI Express used the letters PCI in the name of it mean that the technology is the same as PCI local bus?

A. No. Like I said, we wanted to get rid of PCI local bus because it had served its purpose and would be inconvenient to take it forward. We couldn't extend it any further.

Q. What was the investment in the PCI Express

technology in terms of the number of people and the amount of work involved to develop it?

A. So when I started, within Intel, you know, my closest direct reports, people who worked with me around the clock, about 20 of very, very capable people.

And then there are about 50 people from different divisions because approach was, you know, inform them as you go, get their input so the technology is very implementable.

So about 70 guys just at Intel, and probably 200 people from throughout the industry reviewing every major version of the specification and giving us input.

MS. MARRIOTT: If we can look at Exhibit J-20.

BY MS. MARRIOTT:

Q. So the jury has heard in this trial that the ASUS laptop and desktop that are at issue, that they use PCI Express Version 3.

What are we seeing on the screen?

A. So this is a later version of the spec that was published in 2010. So it's PCI Express 3.0 specification.

Q. And is this the specification for PCI Express Version 3?

A. Yes.
Q. And this specification is, by my count, 860 pages long?
A. Yeah. By this time, a lot -- you know, the complexity went up and a lot more information needed to be provided, I guess.
Q. Is that why it's so long?
A. It is. Because the specifications have exquisite details of the technology because you have to assume that somebody just takes this specification and develops a very complex product without anybody hand holding. So this is the way -- so it defines every aspect of the technology.
MS. MARRIOTT: If we can go back to the slides?
BY MS. MARRIOTT:
Q. How does PCI Express compare with the PCI local bus architecture that we looked at earlier?
A. So PCI Express is a completely different technology. We got rid of the -- you know, on the other one, I was talking about this highway with multiple lanes, and you had this -- everybody was listening to broadcast. This is very different. Here, you only go from one point to another point.
So all the components are connected to each

other through just one port. Nothing is shared. It just goes from one point to another point. So it is not a shared technology, this point to point.

Q. Is there anything the same about PCI Express and PCI local bus?

A. No. It is completely changed here.

Q. Was there anything about the PCI Express architecture that you kept the same?

A. The only thing we kept the same was the PCI config model. And by this time, you know -- actually, at the time of PCI, this config -- even though it says PCI config space, it was a system config space.

So that's the only thing. It's -- the thing I told you about, you know, it's like your home address. All the information is there. So we kept that there because it didn't need to change. You know, you go from UPS to USPS to, say, Amazon. You don't change your home address. So there was no need to change that. So we kept that.

Q. And is that concept that you were just describing, the PCI config space, is that the same thing as software compatibility?

A. No. Software -- software compatibility is not the word that you should use. It's once you can identify what components are there using -- you know, I

10:26 would call it a system, you know, the PCI software model. That's the appropriate word to use, software model.

10:27 Q. Why did you keep that software model or configuration the same?

10:27 A. Because we knew how to communicate information between hardware and software. There's no new thing you're going to do.

10:27 So we took what we had. And then only thing we did with that configuration model was to add some more capabilities thinking that, you know, ten years down the road, if you needed to do something more, let's just have extended config space.

10:27 But we basically kept the same. And that's why the word "model," even though the implementation may be different, and it looks like that.

10:27 Q. Now, let's walk through this just like we did with PCI local bus. And again, say that I have my computer and I've started it up, it's running, and I want to use that computer to display graphics on the screen.

10:27 What's the first step in PCI Express?

10:27 A. So the first step is quite identical to the first step in PCI local bus where CPU runs instructions. As a result, there is -- on the CPU

interface, there is information sent in form of hardware signals.

Now, in this case, you don't have a bridge. You don't have a north bridge. PCI Express being a new architecture defined something new called root complex.

Because things are so -- organized differently inside, it's point-to-point connect. Everything goes into the root complex.

And the role of the root complex is to take cycles from CPU interface and translates them to -- translate them to something PCI Express devices can understand, which are different than PCI local bus devices.

Q. Okay. If we can break that down just a little bit.

How does the CPU instruction that you just described in the PCI Express system compare to the CPU instruction that was in the PCI local bus?

A. So that part is identical. Nothing has changed there.

Q. And at the time that the CPU issues that instruction, has the PCI Express transaction been created yet?

A. No. Not yet. To create a PCI Express transaction to use, we have to wait for root complex.

Q. Okay. So then what's the second step?
A. So the second step is the input comes into root complex. It looks at it. And now in this case, the PCI Express transactions are different. PCI local bus is parallel. Here it is -- you form into packet.
So the unit of information that is sent in PCI Express is in completely different form. It is much more information than PCI local bus had, even in terms of quantity.
In PCI local bus, you send 32 bits of information at once. Here, you could send thousands of bits all at once. So it's really different approach. You assemble all these different pieces of information and then send.
Q. And on this diagram, there are the depiction of some envelopes and letters.
Do you see that?
A. Yes.
Q. Why are they there?
A. So they are there because the transformation that happens is very different, as I said. You create packets of information. Instead of bits of information, you create packets of information.
Q. Does the operating system of a computer create a PCI Express transaction?

A. Operating -- see, in all these computers, your computers -- see, software doesn't know hardware. It just knows the instructions. It has no knowledge of how the signals are created. They're completely decoupled. That is left to all the hardware guys and all the chips that you have.

Q. So does the hardware -- or strike that.

Does the operating system create the PCI Express transaction?

A. No. If operating system did that, your computers would be very, very slow. It just doesn't work that way.

Q. Is the PCI Express transaction created from a PCI local bus cycle, the technology we talked about previously?

A. No. In this picture, there's no PCI local bus, because you start with a CPU and not PCI local bus. If you -- if somebody suggested that you have to use PCI local bus, which runs very slow, it would be like, you know, putting -- on a very high-speed road putting a big speed bump. It doesn't work that way.

Q. Are PCI Express transactions interchangeable with PCI local bus?

A. No. There's nothing common. They're in two. Separate.

Q. So let's -- what's the next step in a PCI Express architecture? What's the third step?

A. So in this case, root complex took the information, as you saw, created bundles. And now that bundle of information -- it's sort of broadcast in the previous case -- it is directed. It only goes to the device or its intended destination. Here, it is graphics.

Everybody else doesn't know that this is happening, and it ends up in graphics. And graphics is -- receives it.

Q. How does that compare to what we saw in the PCI local bus?

A. It is -- like I said, in previous case, you were broadcasting things. Here, you're directing it to just one point.

Q. And what's the fourth step in PCI Express?

A. Yeah. The fourth step is sort of identical. The information is now received by graphics, and it does exactly what it would have done in the previous case, in this case put picture on the screen. What changed here is the middle, the way we delivered things.

Q. Okay. Now, where in this PCI Express process that you just described is there a PCI local bus cycle?

A. There's no PCI local bus cycle in this picture.
Q. Are you familiar with the phrase "address and data" of a PCI local bus?
A. Yes.
Q. Okay. Where in this process is our address and data bits of PCI local bus?
A. PCI local bus isn't there. The address and data are not there.
Q. Are you familiar with the concept of a bus bridge?
A. Yes. I am.
Q. Okay. Is PCI Express a bus bridge?
A. PCI Express is not a bus bridge.
Q. How would you describe the relationship between PCI local bus and PCI Express?
A. Other than name PCI, which is branding, nothing.
Q. In PCI Express, is there ever a conversion of a transaction created by PCI local bus?
A. Oh, Heavens, no. It would be very, very slow. It could work -- I don't think it would work. Because PCI Express has so many advanced capabilities and so much functionality, I don't even -- I don't even want to go into that.

Q. Does software compatibility or PCI configuration space, does that mean that there is a PCI local bus cycle in the PCI Express system?
A. I'm sorry? I don't understand the question.
Q. Sure.
Does software compatibility mean that there is a PCI local bus transaction in this PCI Express architecture?
A. No.
Q. Okay. Does the software compatibility have anything to do at all with the type of transaction that's being created by the system?
A. Software doesn't know transactions.
Q. So no?
A. No.
Q. If we look at the PCI -- the physical PCI Express hardware -- actually, let's do that.
MS. MARRIOTT: Okay. Permission to approach, Your Honor?
BY MS. MARRIOTT:
Q. I've handed you what's been marked as Defendants' Exhibit 1423.
Do you know what the components I've just handed you are?
A. Yes.

10:35 Q. What are they?
10:35 A. This is a PCI Express slot, and this is PCI Express add-in card.
10:35 MS. MARRIOTT: Move to admit.
10:35 MR. TAMKIN: No objection.
10:35 THE COURT: Admitted.
10:35 BY MS. MARRIOTT:
10:35 Q. If we look at the components in your hand for PCI Express, the hardware, how does it compare with the components that you talked about earlier for PCI local bus?
10:36 A. Well, what's interesting, this card has the same functionality as that add-in card. But see how small it is? And see this connector, how small it is?
10:36 It just has very few wires. And even though this has more capability, there's hardly anything there. And that's the beauty of PCI Express.
10:36 Q. And using those physical components, can you demonstrate for the jury how they connect to each other?
10:36 A. Yeah. Just like before, it only goes one way. Snaps in. So when you get it, you can play with it. But it's a very small card. It takes a lot less room.
10:36 Q. How does the PCI local bus slot physically compare to the PCI Express slot?

A. Oh, it's significantly smaller, as you can see from the --

Q. Okay.

MS. MARRIOTT: We can go to the next slide.

A. Even smaller.

BY MS. MARRIOTT:

Q. Now, on the screen, we have the PCI local bus slot depicted on the left and the PCI Express slot on the right.

Is this depiction to scale?

A. Yeah. You can actually put it side-by-side and see the size difference.

Q. Yeah.

And how do they physically compare to each other?

A. This is much smaller, of course.

Q. Are there -- and, you know, we're depicting this on the screen.

Are there other sizes of PCI Express slots and cards?

A. There are. The PCI Express -- you know, PCI local bus is just one connector that -- because it only supports certain functionality, this one is very scalable.

So, for example, this card needs just few bits. It uses a smaller size connector. A graphics or very high-end server could use a bigger connector. It's very scalable.

MS. MARRIOTT: Permission to pass that exhibit around to the jury, Your Honor?

A. Do play with it. It's very interesting. You can probably pass both of them side-by-side.

BY MS. MARRIOTT:

Q. Would it be possible to use a PCI local bus card with the PCI Express slot?

A. No.

Q. Why not?

A. It won't fit if you try it. It won't fit.

Q. How about the opposite? Would it be possible to use a PCI Express card with a PCI local bus slot?

A. No. They're very different technology. It's like -- you know how you plug in a highly technical device in your 240-volt plug, you'll create a fireworks.

Q. So if you plugged PCI Express card into a PCI local bus slot, it would start a fire?

A. Well, if it is a working system, yeah. Don't do it. Even professionals don't do it.

Q. Why not?

A. Because they are very different technology. One is a single-ended technology, and then one is a differential technologies. They're different signals.

You know, if your electrician wrongly wired things and then you have poof. So it's very different, and it is intended to be different.

Q. Why didn't you just include the PCI local bus slot with PCI Express like you did with USB?

A. You know, we were just moving -- there was no value to gain for PCI and forward. In middle throughout -- you know, up to late '90s, we extended PCI a few times. There were different versions of PCI. We tried to be as creative as we could with different versions of it. There were, like, five or six different versions that were created.

It had reached end of the line. It was -- economically, it was no way to do it. Technically, it was not really advantageous. So we had to make a clean break to sort of move forward, and that's exactly what has happened.

Q. How does -- you know, we talked about protocol and signaling with PCI local bus.

Do you recall that?

A. Yes.

Q. How does the protocol and signaling and PCI

Express compare to the protocol and signaling approach in PCI local bus?

A. So my team and I knew PCI local bus intimately. We had all worked on the technology. We knew the strengths and weaknesses. But one of the biggest point was PCI local bus was that it was monolithic. It had very limited degree of freedom in changing, you know, signaling and protocol. We tried different ways. Didn't work.

When we defined PCI Express, one of the controversial part was to arrange it such that we separate out protocol and signaling and actually some other elements of the technology with a view that, in time, computer chips get faster, silicon technology gets better. So we want to have as advanced signaling as possible, so keep that separate. Don't tie it with protocol.

And over time, you have new users of things, you want to extend protocol, develop it separately. So we started to develop these two things in -- you know, simultaneously so that they can evolve even better in the future.

So changing one wouldn't change anything else on other and vice versa. So that's the approach we took.

10:41 Q. Okay. And what is this slide showing?
10:41 A. Ah. So this is one of the -- in I think Year 2001, when we did the first disclosure, because it was a controversial decision, I had to go convince people. What's the benefit of PCI Express?

10:42 Because first question people -- I mean, people ask is, why don't you just take what you have and use it or extend it? So these are the examples of how the technology was extended in various versions.

10:42 And you could see initial -- so PCI was running at about one and a half megabits or million bits per second. And extreme right bar is the first version of PCI Express that is running at 100 -- you know, at 100 megabytes per second. And so this is what I have. It's 100. So it's more than 20 times faster.

10:42 So once people look at it and say, wow. You extended all these other versions, and they still don't match up to your first version of PCI Express. And this is one of the biggest benefits that people saw, that you suffer pain, there's a gain. And here's the quantification of the gain.

10:43 Q. Okay. Why was PCI Express able to achieve the speed that it was able to achieve?
10:43 A. Yeah. So this is sort of a graph that depicts from early days of PCI local bus to sort of, I guess,

in this case, 2021 version of PCI Express.

And as you can see the graph, the performance -- on the left-hand side, you see the transfer rates, how fast things are going. So you see continued evolution of the technology.

So you saw PCI go from 1992 to 2002. Here you see nearly flat line. It's improved just slowly. But then you'll see this astronomical jump in performance.

And this is possible because of the choices we made, i.e., you know, layer architecture, serial differential technology and all.

Q. Would it be fair to say that PCI Express is just a serialized version of PCI local bus?

A. Oh, no, no, no. Not at all.

Q. Why not?

A. Because that's not what it is. You couldn't -- say, for example, you have a six-inch pipe and you're trying to --

(Clarification by Reporter.)

A. Imagine you have a six-inch pipe and you're trying to put some water through there. The rate of water trickling in is very low. What you would get at the other end would be a trickle.

PCI Express is a big hose. It needs much faster data, and that only comes from CPU. Because in

this time, you know, PCI Express has gone faster. CPUs has become even faster than this. So what comes in there is much faster rate of information.

Q. Did you ever -- during the development of PCI Express, did you ever consider just converting PCI local bus into PCI Express?

A. No. Because you saw in the previous diagram, you saw all the attempts that we made in improving PCI or six terms of the technology. It couldn't be done.

And that's why, as I told you earlier, that this was a risky and controversial decision. If this technology didn't work, I would be totally unemployed forever and ever because it was a big risk.

And that's why it required tremendous amount of talent and rigor and precision and creativity and on and on. This was probably the most challenging thing I've done in my professional career.

Q. Do today's Intel chips support that old PCI local bus technology?

A. PCI local bus technology cannot be supported because the physics of the new silicon technology is such that they -- it's very difficult or uneconomical to support that high voltage and...

THE COURT: Counsel, about how much time do you have left with him?

MS. MARRIOTT: Two more questions.
THE COURT: There you go.
MS. MARRIOTT: Thank you, Your Honor.
BY MS. MARRIOTT:
Q. Okay. Mr. Bhatt, did you secure any patents on PCI Express technology?
A. Yeah. Most of my 132 patents are for PCI Express, and this is -- one day I just laid them out on a dining table and this is just a small subset of it.
Q. Was it easy for you and your team to develop PCI Express?
A. Easy is not the word. You can use a lot of other words. Easy is not the word. But it was thrilling. It was exciting.
You know, now that I'm retired, I'm looking back at my engineering career. And as I reminisce, the thought that comes to mind is that I was given an opportunity to develop this technology, and I left computer industry in better shape than I found it.
Just like USB, PCI Express is -- you know, has made profound difference to computer industry. You cannot build a computer today without this technology. So this is my American dream.
This is -- you know, I was given the opportunity to make a difference and I made it. And

I'm very thankful for the opportunity.

Q. Thank you, Mr. Bhatt.

A. Thank you.

MS. MARRIOTT: Pass the witness.

THE COURT: Let's take our morning recess. Please remember my instructions. We'll be back in 10 or 15 minutes.

THE BAILIFF: All rise.

(Jury exited the courtroom.)

THE COURT: You may be seated.

Is there anything we need to take up?

MR. BURESH: Not for us, Your Honor.

MR. TAMKIN: No, Your Honor.

THE COURT: Who will follow -- will your technical expert be next?

MR. BURESH: Can I let you know after break? See where we're at on the slide changes?

THE COURT: Oh, oh.

MR. BURESH: We may need to change the order.

THE COURT: Oh, sure.

Who all do we have -- I'm just trying to figure out for the day. Who all do we have today?

MR. BURESH: Sure. We have two more experts, Dr. Edwards and Mr. Mike Newell on the damages

side.

THE COURT: And then you're done?

MR. BURESH: And then we're done.

THE COURT: Oh, gosh. Okay. Very good.

So let's plan then on -- and you will have -- you're putting on a validity case -- invalidity?

MR. BURESH: It'll be part of Dr. Edwards' presentation.

THE COURT: Y'all will have a rebuttal on validity?

MR. HALES: That's right, Your Honor.

THE COURT: Okay. So we won't finish today, but we'll likely finish tomorrow, it looks like.

So let's plan on doing the jury charge conference this afternoon. And again, just whoever wants to attend can. And when we finish today -- this doesn't need to be on the record.

(Off-the-record discussion.)

THE BAILIFF: All rise.

(Recess taken.)

THE BAILIFF: All rise.

THE COURT: Please remain standing for the jury.

(Jury entered the courtroom.)

THE COURT: Thank you. You may be seated.

Counsel?

CROSS-EXAMINATION

BY MR. TAMKIN:

Q. Good morning, Mr. Bhatt.

A. Good morning.

Q. My name's Greg Tamkin.

We have only just met moments ago, correct?

A. Yeah.

(Clarification by Reporter.)

BY MR. TAMKIN:

Q. I'm going to be asking you a bunch of questions here today, and hopefully we'll engage in a good dialogue.

So this -- you understand this is a patent case, correct?

A. Yes.

Q. In fact, you have 132 patents in the United States and all over the world, correct?

A. Yes.

Q. You're proud of your patents, aren't you?

A. Yes.

MR. TAMKIN: Let's put up Slide 12.

BY MR. TAMKIN:

11:08 Q. I think in your presentation, you put on a picture of -- well, it's a picture of a plaque of one of your patents, right?
11:08 A. Yes.
11:08 Q. And so what you have done is you have taken one of your patents and taken the cover page and turned it into metal and mounted it so you can hang it on the wall, right?
11:09 A. It's not on the wall.
11:09 Q. I understand. But it's mounted such that it could be hung on a wall, right?
11:09 A. Yes.
11:09 Q. So mounted, this is not the whole patent. It's one -- it's the cover page of the patent that is made for presentation and for show, right?
11:09 A. Yes.
11:09 Q. Okay. In fact, you know that patents are much more significant than just the page, but you're proud of this.
11:09 I'll ask it again.
11:09 You understand that patents are much more than just one page that's mounted on a piece of wood, right?
11:09 A. Yes.
11:09 Q. And patents look like this when they come, don't they?

11:09 A. I have no idea. I don't have this thick a patent.
11:09 Q. This is a pretty thick one, right?
11:09 A. Yes.
11:10 Q. It's a lot in this patent, right? It's thick?
11:10 A. I don't know what's in there.
11:10 Q. You had -- I think you said it was thick, though, right?
11:10 A. By just look of it.
11:10 Q. And your patents aren't as thick, are they?
11:10 A. I don't remember how thick they are.
11:10 Q. In fact, you understand this is a case about five patents actually, or a number of patents anyway, correct?
11:10 A. I don't know that.
11:10 Q. You don't know how many patents are in this case, right?
11:10 A. I don't.
11:10 Q. But you do know it's a patent case?
11:10 A. Yes.
11:10 Q. Okay. And you haven't read any of the patents in the case, have you?
11:10 A. Not for this case.
11:10 Q. And you don't know if the Court has construed -- you don't know how the Court has construed

any claims in this case, right?
A. I don't.
Q. Okay. And you don't even know if there's been a claim construction in this case, fair?
A. I don't.
Q. Because you have patents, you know that there are parts of patents, correct?
Do you need me to be more specific?
A. Please.
Q. Sure.
There's something that's on the cover page called the abstract.
Do you see that on your cover page here?
A. Yes.
Q. And there's something called the specification, where you describe in detail all the various different elements of background and information about your invention, right?
A. I don't recall my patents and how they're written. They were written a long time ago.
Q. But you have 132 of them, right?
A. Yes.
Q. Okay. And there's also parts of a patent called the claims, correct?
A. You know, I don't remember most of the stuff

11:12 about it. It was a long time.
11:12 Q. I just want to know if you remember that there are claims in a patent.
11:12 A. I -- I -- quite frankly, I don't remember.
11:12 Q. Do you know that the claims define the invention?
11:12 A. I don't remember much of my patents other than the overall concept, technical concept. I don't know the legalese.
11:12 Q. I saw a slide at the very end of your presentation with all of the patents in front of you, right?
11:12 A. They were just the plaques.
11:12 Q. They were just the plaques.
11:12 And you wanted to explain to the jury that you have a lot of patents and you're very proud of all of those plaques, right?
11:12 A. Yes.
11:12 Q. Okay. In any event, you, in this case, don't have -- you understand that it's a patent infringement case, right?
11:13 A. I don't know much about this thing.
11:13 Q. So you don't -- do you understand that there's something called infringement of a patent?
11:13 A. I understand general concept.

11:13 Q. Okay. And in any event, you don't have any opinion in this case about -- you haven't rendered any opinion in this case or given any opinion in this case about infringement because you haven't even read the patents, right?

11:13 A. Yes. Yes.

11:13 Q. And to the extent that this case -- there's an allegation of invalidity of some fashion, you aren't here to tell us about invalidity because you haven't read the patents, right?

11:13 A. Yes.

11:13 Q. And you don't know what the claims even say because you don't know what parts of the patents are claimed or you haven't read them?

11:13 A. Yes.

11:13 Q. Okay. And you certainly haven't looked -- taken the patents and compared them to the ASUS products, the ASUS group products in this case, right?

11:14 A. Yes.

11:14 Q. You haven't done that, correct?

11:14 A. Yes.

11:14 Q. And likewise, you haven't looked at -- taken the patents and compared the claims of those patents to the specifications of the PCI Express 3.0 or the USB 3 -- USB specifications, correct?

A. Yes.
Q. By the way, those specifications --
MR. TAMKIN: If we can pull up J-20, please.
BY MR. TAMKIN:
Q. I think you looked at J-20.
This was the -- I think the specification you looked at, which is the PCI Express Base Specification Revision 3.0, right?
A. Yes.
Q. I don't remember exactly, but I think you said it was 860-some odd pages approximately?
A. Somewhere like that.
Q. It's a really detailed document, right?
A. Yes.
Q. And you made it detailed because you wanted to be sure you explained how PCI Express was going to work, correct?
A. Yes.
Q. You wanted -- I think you said you wanted developers to be able to use this so they can just look at the specification and develop from there, right?
A. One correction, I didn't write this document.
Q. Fair enough.
A. So whatever writing there, I don't know. But

in general, the concept, it's true.
Q. And I think you said you spent -- you wrote the USB specification and maybe an earlier PCI Express specification; is that right?
A. That would be right.
Q. And so your understanding at least of the USB specification that you wrote, it was supposed to be comprehensive, correct?
A. Yes.
Q. And certainly, the PCI Express base specification that you wrote back in 2005 or whenever it was, that was supposed to be very comprehensive, right?
A. Yes.
Q. And it was meant to be relied upon by people to help understand how PCI Express worked?
A. Yes.
Q. And you understand that that's what Exhibit J-20, this PCI Express base specification, you understand that's how it's supposed to work too?
A. Say that again. I'm sorry. It was a long-winded...
Q. Not a problem. It was. I apologize.
You understand that the way that the PCI Express Base Specification Revision 3.0 was supposed to

work is that it's supposed to be a detailed document to help developers understand PCI Express?

A. Yes.

Q. Okay. Now, you talked a lot in your testimony about all the work you did to develop PCI Express, and I think the starting point was you wanted something new, right?

A. Yes.

Q. And that it was -- at least for -- PCI local bus had kind of come to the end of its life. It was creating a bottleneck, was your words?

A. Yes.

Q. And by "bottleneck," was it slow?

A. Actually, there were many more things than just slow.

Q. It was slow, though, correct? Yes?

A. One of many things. Yes.

Q. Had a lot of wires too, didn't it?

A. Yes.

Q. I think we looked at -- the jury looked at a couple of --

MR. TAMKIN: If I may, Your Honor.

BY MR. TAMKIN:

Q. The jury looked at a couple of these, and one was kind of -- it was pretty big. One's a lot smaller,

right?

A. Yes.

Q. So size was important, right? Reduction of -- or the size was something that was a -- strike that.

Size was an issue with PCI local bus, right?

A. I wouldn't say it that way. That was not the motivation.

Q. Number of wires. There was a lot of wires, weren't there?

A. Yes.

Q. So one of the motivations was to reduce number of wires?

A. Yes.

Q. Okay. And -- okay.

And you weren't the only one who was -- who would have recognized in the late '90s that the PCI local bus specification -- or excuse me -- the PCI local bus was coming to the end of its life or was creating a bottleneck, right?

A. Perhaps not.

Q. In other words, the problems with speed, other people in the industry would have been experiencing as well, right?

A. Possibly.

Q. And it's likewise other people would be

11:19 experiencing frustration with the number of wires as we -- that you just recognized as an issue, right?

11:19 A. If you say so.

11:19 Q. And based on these frustrations, you decided that we should come up with something to address these frustrations; is that correct?

11:19 A. Yes. From my side, yes.

11:19 Q. Yeah. From your side.

11:19 And so when you're trying to come up with those frustrations -- or excuse me -- the new product, you identify some of the issues in the prior technology -- or the current technology and try and develop something improved on that technology, right?

11:20 A. I wouldn't quite say it that way, but...

11:20 Q. Okay. You certainly want to create a new technology that will address the problems that you're dealing with, right, or experiencing?

11:20 A. Yes.

11:20 Q. Okay. And so you created a new technology, at least in -- both USB and PCI Express, that was an improvement at least in terms of speed and in terms of wires, right?

11:21 A. I would say it differently, but my team and I.

11:21 Q. Oh, I apologize. That's fair.

11:21 And I think one of the things you said about

USB technology is that over time you came up with the idea to -- maybe you didn't come up with the idea, but it -- it sent signals differently than older technologies; is that right?

A. Yes.

Q. It used differential signaling; is that right?

A. You're not accurate on this one. Differential signaling was used all throughout.

Q. Okay. It -- it wasn't used -- differential signal wasn't used in PCI local bus, right?

A. Yes.

Q. Rather, it was -- that was new to PCI Express?

A. I wouldn't say it that way.

Q. It was -- if you go from 2nd Generation local bus, no differential signal, correct?

A. Yes.

Q. 3rd Generation PCI Express, there was differential signaling?

A. I'm sorry. No, no, no. You're incorrect.

Q. There's no differential signaling in PCI Express?

A. PCI Express was always differential signaling.

Q. Okay. I'm not sure what I said then.

2nd Generation --

(Simultaneous conversation.)

A. 2nd Generation PCI Express, no differential signaling.

BY MR. TAMKIN:

Q. I'm sorry.

PCI Express 2nd Generation, PCI local bus 2nd Generation, no differential signaling?

A. Say that again.

Q. PCI local bus was a 2nd generation, right?

A. All versions of PCI local bus were single-ended.

Q. Were? Excuse me?

A. Single-ended.

Q. Single-ended, no differential.

(Simultaneous conversation.)

BY MR. TAMKIN:

Q. Whereas the PCI Express is differential signaling?

A. Yes.

Q. And PCI Express, I think, is -- also it has unidirectional -- unidirectional lines; is that right?

A. Yes.

Q. And --

A. Two different directions.

Q. Thank you.

Lines going each way, yes?

A. Yes.
Q. And likewise, PCI local bus had bidirectional lines, correct?
A. You could say it one way. Yeah.
Q. And by the way, USB 2.0 had bidirectional lines, right?
A. Same as PCI Express.
Q. USB 2.0?
A. USB 2.0 is not there. It is --
Q. Bidirectional?
A. You say -- you can say it differently.
Q. I'm saying USB 2.0 is bidirectional. 3.0 is unidirectional?
A. Fine.
Q. Okay. And one of the things we have been talking about, just so we can follow this up, is, and certainly the local wires in USB -- strike that.
Certainly with respect to PCI local bus, it was a parallel interface, right?
A. Yes.
Q. And that's why it had so many lines, right?
A. Yes.
Q. And if you're trying to reduce the lines, going to serial interface was a -- helped accomplish that goal, fair?

A. Yes.

Q. Okay. And PCI Express does have serial communication, right?

A. Yes.

Q. Okay. And as a result of these improvements and others, it seems like PCI Express has gotten a lot faster; is that right?

A. Yes.

Q. Now, since we're delving into the technology here, in terms of the differences and similarities between the two, I think you said that these two slots and cards with -- one's a PCI Express, one's a PCI local bus -- they do -- they perform the same function, right?

A. I don't know what you mean by --

Q. Actually, I was going to ask you because that's what you said. Do you recall saying that, that they can perform the same function?

One's much bigger; one's much smaller, right?

A. I was communicating something different. I can explain if you want me to.

Q. I don't need you to explain. I just want you to say -- you said that they performed the same function, right?

A. I was trying to -- okay.

11:26 Q. Okay. And because what you're trying to do is you're trying to solve a problem, which is one has a lot of lines, one has fewer lines. I want them to still be able to do some of the same things, right?

11:26 A. Yes.

11:26 Q. Okay. And in the end, you want them to be able to communicate information across those pathways or lines, right?

11:26 A. Yes.

11:26 Q. Okay. You talked about the similarities and the differences, and the one similarity you said was the software model. And I want to understand that.

11:26 So you said you kept the software model; is that right?

11:27 A. Yes.

11:27 Q. And that's the software -- no.

11:27 That's how the product -- that's how the hardware pieces can talk to each other. The model, it helps --

11:27 A. No.

11:27 MR. TAMKIN: Okay. Let's take a look at Slide 31.

BY MR. TAMKIN:

11:27 Q. Okay. This was part of -- at least what I had on the screen when you were talking about that.

11:27 A. Yes.
11:27 Q. And you're saying that there's different packets as opposed to the old way that the data was transferred, but you were talking about the software model as the same. I had some questions about this particular slide.
11:27 As I look at it, I think the little green box, they're talking about the packets, right?
11:28 A. Yes.
11:28 Q. Those are little envelopes effectively, right? It's a way to think about it?
11:28 A. I have a simplified version.
11:28 Q. You approved this, right?
11:28 A. Right.
11:28 Q. Okay. An envelope has an address on it, right, on this envelope here?
11:28 A. Yes.
11:28 Q. And inside that envelope is some data, right?
11:28 A. Yes.
11:28 Q. Okay. And so let's -- okay. So I want to talk a little bit about the process of forming --
11:28 MR. TAMKIN: We can take this one down.
11:28 BY MR. TAMKIN:
11:28 Q. The process of doing all the work you did with that group. I think you said with PCI Express, you got

a -- well, with USB, you got a bunch of industry players together and everybody decided to get together and make USB happen, right?

A. Yes.

Q. The same thing happened with PCI Express, right?

A. Yes.

Q. You used that kind of same model?

A. Yes.

Q. And I think what they were called was the Arapahoe working group or Arapahoe group?

A. Yes.

Q. Who came up with that name?

A. Some marketing person.

Q. Okay. Again, you're talking about the -- you told counsel that engineers aren't very good at coming up with names, but I like that one, so...

In any event, at that group, they -- you all talked about the problems that you were going to try to solve, right?

A. Yes.

Q. And you would talk about speed or wires or all the other issues, right?

A. Yes.

Q. And when you're talking about those other

issues, you invited people like from Intel, right? Yes?
A. Yeah.
Q. There's many more people from Intel than you, right?
A. Yes.
Q. And I think you also invited to be on that original steering committee people from Microsoft; is that right?
A. Yes.
Q. Compaq; is that right?
A. Yes.
Q. Compaq became part of HP, didn't it?
A. Yes.
Q. Okay. You invited -- did you invite people from HP as well?
A. Yes.
Q. Okay. And Dell; is that right?
A. Yes.
Q. And IBM, right?
A. Yes.
Q. These were all big industry players, right? And you said you all decided to create an open standard, right?
A. Yes.

Q. Now, all of those companies, other than Intel, manufacture computers, servers, products like that, right?
A. Yeah.
Q. And they did at the time, right?
A. Yes.
Q. And Intel makes the products that go inside those computers, servers, et cetera, right?
A. Yes.
Q. Okay. So those companies were there creating what you call is an open standard, but all of those companies were intending to use that standard, right?
A. Yes.
Q. And all of those companies were going to sell their products based on that standard, right?
A. Yes.
Q. And all of those companies were going to make money presumably selling their products, right?
A. I would hope so.
Q. That's how it works, right?
And do you know that Microsoft has taken a license to the ACQIS patents?
A. No.
Q. Do you know that HP has taken a license to the ACQIS patents?

11:31 A. I don't.
11:31 Q. Do you know that Dell has taken a license to the ACQIS patents?
11:31 A. I don't.
11:31 Q. Do you know that IBM has taken a license to the ACQIS patents?
11:31 A. No.
11:31 Q. Those companies, I think you said they have -- well, I think you said from Intel you got the best of the best, right?
11:32 A. Yes.
11:32 Q. Those companies also, you thought, had the best of the best engineers, didn't they?
11:32 A. Yes.
11:32 Q. They have really good engineers, HP and Microsoft and Dell, right? Or at least they did at the time, right?
11:32 And those engineers also know how to read patents, don't they?
11:32 A. I have no opinion on that.
11:32 Q. Those engineers write patents, don't they?
11:32 A. I don't know which engineers you're talking about.
11:32 Q. Fair enough.
11:32 You certainly are aware that Microsoft

engineers, HP engineers, Dell engineers have the opportunity to write patents just like you?

A. If you say so.

Q. Those people who were at those meetings, some of them wrote patents, didn't they?

A. Yes.

Q. And they got patents on things -- aspects of USB or aspects of PCI Express, right?

A. Yes.

Q. Now, you said you were here because you wanted to explain information that was new or that only you knew about the development process, right?

A. Yes.

Q. Have you been told that anyone's trying to take credit for your inventions?

A. I don't -- nobody's -- in this case?

Q. Yes.

A. No.

Q. Okay. And you understand that people like yourself, other engineers, other people in the industry in the 1990s are capable of coming up with ideas to come up with new buses or solve problems that they experience with PCI local bus, right?

A. It may have happened.

Q. Sure. And you're not saying that somebody

can't come up -- couldn't have come up with an idea that incorporated aspects of PCI Express or USB 3.0 or any of the future technology before you did, correct?

A. Please repeat your question.

Q. You're not here to tell this jury that it was impossible for Mr. Chu to come up with aspects of PCI Express before you did, correct?

A. No. I'm not here --

Q. And you're also not here to -- since you haven't read the patents, you're not here to say that Mr. Chu's patents cover every aspect of PCI Express, right?

A. No.

Q. And frankly, it would be impossible for them to cover every aspect of an 800-page document, right, in the patent?

A. I don't know whether it's possible --

Q. Let me ask you it this way: You've written patent -- you've seen your patents and your patents don't cover every aspect of PCI Express, right?

A. I don't know how to --

Q. They cover --

(Simultaneous speakers.)

Q. Let me ask it this way: Your patents only cover various aspects of PCI Express, right?

A. Yes.
Q. And likewise, you understand that generally patents cover -- well, strike that.
Let me just look over my notes here.
Now, I appreciate your coming here. I appreciate your talking to the jury here today, and I appreciate your answering my questions.
Counsel did ask you that your -- about your compensation for this case, right?
A. Yes.
Q. She didn't ask you how much you're making, did she?
A. No.
Q. You're charging $1,200 an hour for your appearance and work on this case; isn't that right?
A. Yes. Yes.
Q. $20 a minute, right?
A. If that's the math.
Q. You can do that math, right?
MR. TAMKIN: I have nothing further.

REDIRECT EXAMINATION

BY MS. MARRIOTT:
Q. Mr. Bhatt --
A. Yes.
Q. -- you were asked by Mr. Tamkin whether the

PCI local bus slot and card perform the same function as the PCI Express slot and card.

Do you recall that?

A. Yes.

Q. And it sounded like you wanted to give an explanation, so I wanted to give you that opportunity.

And I guess the question is: Do these two different slots and cards perform the same function?

A. Well, the one that is bigger one performs PCI local bus transactions. The smaller one does PCI Express transactions.

Where they're similar is in one case, it's a local area network card, which is bigger, that is compliant with PCI local bus. The other one is PCI Express-compliant local area network card.

So where they're similar is it's a local area network card. They're different because they have different protocols and signaling.

Q. Now, you were also asked about the compensation that you're receiving in this case.

Do you recall that?

A. Yes.

Q. Do you have any plans for that money?

A. You know, I'm not going to keep a cent of that money. I never wanted to get involved in any lawsuit.

But I -- once I got involved, I want to make sure they don't abuse my time, because I'm retired. I'm looking after my mom. I didn't want to spend any extra time on anything else.

I don't need the money. This is not about the money. Some capable kid will benefit from this scholarship. So it's never been about the money. It's always been about the principle.

Q. Thank you.

A. So that settles that. I hope.

MS. MARRIOTT: I'll pass the witness.

MR. TAMKIN: Nothing further, Your Honor.

THE COURT: Thank you for being here, sir. You're welcome to stay in the courtroom.

He's excused, correct?

MR. TAMKIN: He is.

THE COURT: You're welcome to stay in the courtroom for the rest of the trial, or you're welcome to go home, whichever you prefer.

THE WITNESS: Thank you so much for having me.

THE COURT: Who's your next witness?

MR. COLLARD: Your Honor, just briefly, we have a proposed instruction for the next witness that we had talked about.

11:39 THE COURT: Okay.
11:39 MR. BURESH: Your Honor, may I approach?
11:39 THE COURT: Of course.
11:39 MR. BURESH: Or we?
11:39 (Bench conference.)
11:39 MR. BURESH: I believe my revised slides and outline just arrived, so I can proceed. 30 seconds ago, I wouldn't have thought I was going to be able to.
11:40 THE COURT: Okay.
11:40 MR. COLLARD: You're going to proceed with Dr. Edwards?
11:40 THE COURT: Do you guys agree on this instruction?
11:40 MR. COLLARD: Your Honor, if there's something else you want to say --
11:40 THE COURT: I mean, have you seen the instruction that he's proposing?
11:40 MR. BURESH: I haven't personally seen it.
11:40 Did my team approve it?
11:40 MR. COLLARD: Travis and -- yes. They said yes.
11:40 THE COURT: It looks very innocuous to me.
11:40 MR. BURESH: Great.

THE COURT: So your damages person is ready to go?

MR. BURESH: No. We're going to do our technical expert now.

THE COURT: So do you want me to -- why don't I wait for the damages?

MR. BURESH: It makes more sense for me, because I've got -- there's, you know, patents that are disappearing out of both, so I would agree to that before the next witness.

MR. COLLARD: That actually makes sense to us so they're not wondering why they're not --

MR. BURESH: Your Honor, does it make sense to -- do we want to just get started and -- or do you want to take an early lunch?

THE COURT: What I would do is I'll read this, you can put him on and prove him up, and then we'll break for lunch.

MR. BURESH: Okay. Sounds good.

THE COURT: Does that work?

MR. COLLARD: Yeah.

(Bench conference concludes.)

THE COURT: Okay. Ladies and gentlemen, I'm going to read you an instruction.

As you knew, you all got here this

morning at 8:30 and we didn't get started for a little while because we were taking up an issue.

During that -- the hearing I conducted outside of your presence, I made a ruling regarding the plaintiff's allegations regarding the infringement of certain method claims.

The patents are the '797 patent, the '140, the '654, and they are no longer a part of the case.

The plaintiff will now be seeking $17,970,582 in damages for the claims that remain for you to consider with respect to infringement and validity.

The parties will no longer be discussing the method claims or patents. I tell you that because we're about to hear from the defendants' expert with respect to infringement or noninfringement, and I didn't want you to wonder why he wasn't going to be discussing those issues.

You should not allow my decision with respect to the method patents to have any impact on you with respect to any other issue in this case. That was something I determined as a matter of law and determined that there were no fact issues.

We have plenty of fact issues remaining,

11:42 and that's why you all are here is to be the judge considering those fact issues.

11:42 So don't speculate why they are -- the other claims are or are not in the case.

11:42 Counsel, you have a next witness?

11:42 MR. BURESH: Your Honor, we call Dr. Stephen Edwards.

11:43 MR. TAMKIN: Your Honor, before we do, we do have an issue with some of the demonstratives.

11:43 THE COURT: You won't before lunch.

11:43 MR. TAMKIN: Fair enough.

11:43 THE COURT: Okay.

11:43 (The witness was sworn.)

11:43 DIRECT EXAMINATION

11:43 BY MR. BURESH:

11:43 Q. All right. Are you situated, Dr. Edwards?

11:43 A. I believe so. Can you hear me clearly?

11:43 Q. Yes. Thank you.

11:43 Dr. Edwards, can you please state your full name for the record?

11:43 A. Yes. I'm Stephen Edwards.

11:43 Q. And where do you currently reside?

11:43 A. In New York City.

11:44 Q. Okay. Can you tell us a little bit -- I think you've been sitting in the courtroom for most of the

case, correct?
A. That's correct.
Q. And we all talk about our families and all that when we introduce ourselves?
A. Right.
Q. Could you go ahead and do that for the jury?
A. Sure. Sure. So I grew up in Minnesota, went to California for school. Was, what, six years, eight years after that, I met Nina. A few years later, in 1999 -- well, yeah. Exactly 25 years and two weeks ago, we were married.
In 2001, we moved to New York City. And we now have two children: A son, he's 20; and a daughter, she's 14.
Q. What are their names?
A. Kyle and Lauren.
Q. Okay. Let's talk a little bit about your educational background.
Could you start us in high school but college forward?
A. Absolutely. So in 1988, like I said, I went to California. I went to California Institute of Technology and graduated with a B.S. in electrical engineering in 1992.
Q. Okay. After you got your bachelor of science

in electrical engineering, where did you go next for your education?

A. I went up to Berkeley, California to the University of California Berkeley.

Q. What degrees did you secure from Berkeley?

A. So in a few years, in 1994, I got my master's, also in electrical engineering. And in 1997, I got my Ph.D., also in electrical engineering.

Q. And both of those were from Berkeley?

A. That's correct.

Q. What did you do after you obtained your Ph.D. in 1997?

A. So I worked in Silicon Valley for a few years. I worked for a couple of software companies that were developing software that would enable engineers to design computers.

Q. Okay. And the time frame that we've been talking about in this case, the 1998 to 2000 window, what were you doing in that time frame?

A. Yeah. So I was working for those companies, observing the computer industry, but developing software that would help engineers to develop computers.

Q. Okay. And after you worked for these various companies you've described, what was the next step in

your journey?

A. Yeah. So in 2001, my wife and I moved across the country, and I took a job at Columbia University teaching in the computer science department.

Q. I'm not going to do the math. How long have you been at Columbia University?

A. Let's see. That's 23 years now.

Q. 23 years. Okay.

And are you an actual classroom professor?

A. Absolutely.

Q. Like in the classroom teaching is what I mean by that.

A. Absolutely. No. I really enjoy teaching. There's a variety of classes that I teach.

Q. Tell us about some of those.

A. So the most interesting one and the one that's actually going on at the moment, I teach -- I call it embedded system design. So what we do is build little computer systems but then make them -- make them do applications.

So in fact, I teach the students how to build 1980s video games and that's fun. They do both the software for the game logic, but then I also have them do the hardware that does the fancy graphics, and I also have them -- typical thing is connect up a

joystick through USB.

Q. At a high level, tell the jury about some experiences you've had with computer system design.

A. Oh, my. I've been doing this for a very long time. Let's see. I started programming in, what, 1982. Actually got -- managed to get a statewide award for doing it in 1983.

Let's see. About 1986, I designed the first -- I designed a -- this was the first card that I designed that would slot into a computer. It wasn't an IBM PC. It was an Apple II at that point.

Continued that. Built a number of projects like that when I was at Caltech. Went on to Berkeley. Continued to build things. I've been working with the stuff for a long time.

Q. So you were building computers since high school?

A. I was building computers since high school.

Q. And that would have been the mid '80s?

A. Yeah. Late '80s.

Q. What about communication buses?

A. So as I mentioned, that high school project was actually for a physics class. I built a sound card, and that went into the bus that was being used.

The Apple II wasn't an ISA bus or PCI bus or

anything like that. It was quite a bit more primitive. But to do that, I had to understand the bus protocols and the rules about that.

Q. What about more recently? Have you taught classes on -- that would cover communication buses?

A. Absolutely. So one of the key ideas I tried to get across to my students in this embedded systems class is how you get hardware and software to communicate.

And the answer is you do that through a bus. So I go through the history of buses, and I teach them a very specific bus. And they go off and actually build things that connect up to that bus.

Q. Now, how does the experiences and the education that you've just described inform the testimony that you'll -- you want to provide to the jury here today?

A. Well, so I've dealt with this technology in one form or another for decades now. And I actively teach it. And I'm looking forward to teaching you a bit of it too.

Q. Do you believe you're qualified to offer opinions in this case to a reasonable degree of engineering certainty in light of your background and experience?

11:50 A. Absolutely.

11:50 MR. BURESH: Your Honor, I tender Dr. Edwards as an expert in computer system design and computer peripheral communications.

11:50 MR. HALES: No objection, Your Honor.

11:50 THE COURT: He'll be admitted as an expert.

11:50 Ladies and gentlemen of the jury, we're going to go ahead and take our lunch recess now. If you all would be back, we will begin at 1:15. Please remember my instructions.

11:50 THE BAILIFF: All rise.

11:50 (Jury exited the courtroom.)

11:50 THE COURT: You may be seated.

11:51 Doctor, you may step down.

11:51 Okay. I'm happy to take up any slides we need to with regard to that.

11:51 MR. HALES: Your Honor, the issue's pretty discrete. There are two slides with a similar approach. The slide which we'll present to you here is one of the claims that has been scratched out in red marker to show names of the accused standards. We believe it's a violation of MIL 7, intimating that --

11:51 THE COURT: I have to -- if I could see the slides.

11:51 MR. HALES: Yeah. We'll bring it up for you here.

THE COURT: Okay.

11:52 MR. HALES: We feel this is an intimation that we've attempted to capture standards with our patent claims and that that's not allowed under MIL 7.

11:52 THE COURT: There we go. Great. Okay. I'm with you. Thank you.

11:53 So this is the -- Slide 73 is a slide they want to show.

11:53 MR. HALES: Yeah. On our last count, there were two such slides.

THE COURT: Okay.

11:53 MR. HALES: It's moved around in view of the Court's ruling.

11:54 THE COURT: Okay. So when they were -- when this gentleman gave you the expert report, did he do something like this? Did he replace the words -- first low voltage differential signal channel with PCI -- did he explain to you this was what he intended to say? Or something analogous?

11:54 MR. HALES: The theory in the report is if you read these limitations as being in these standards, you need to enable the entirety of these standards. You need to have written description for

the entirety of these standards, which we think is wrong as a matter of law.

But also under the Court's MIL, we're worried that the thing that the jury will take away is that we are attempting to capture these standards and that the requirement then is that we enabled the entirety of those standards through our simple limitation that's being scratched out.

In other words, they're really just multiplying the burden by taking out the actual claim language and putting in something that is far broader than the claim language itself.

THE COURT: Okay. A response?

MR. BURESH: Your Honor, this is precisely the --

THE COURT: Why don't you -- if you'll come up.

MR. BURESH: This is precisely the written description theory that we disclosed to them, which is that if these claims -- the full scope of the claims encompass PCI Express or USB 3 as is the allegations in this case, then the full scope exceeds the scope of the disclosure.

That is exactly the theory we disclosed to them, and that's what we're depicting here. And

11:55 candidly, it has absolutely nothing to do with MIL 7.

11:55 This is -- this is not suggesting there's anything improper about getting the claims that they got. We're saying as they come into court and make these allegations of PCI Express satisfying the LVDS limitations, that that exceeds the full scope of the -- the scope of what was enabled and described in the patents.

11:56 THE COURT: Because your expert is then going to go on and say if you look at the written description, it doesn't sufficiently enable this? He's going to tie this together?

11:56 MR. BURESH: Correct. That the -- the inventor, through the four corners of the documents, was not in possession of the full scope of this invention and that the full scope is not enabled.

11:56 THE COURT: And I take it and the same will be true with the other -- the reference to the interface?

11:56 MR. BURESH: Correct, Your Honor.

11:56 THE COURT: And in your -- in his expert report, when he's discussing this, he explained -- he explained this was his theory?

11:56 MR. BURESH: That you cannot substitute the one for the other and still satisfy the written

11:56 description and enablement requirements.

11:56 THE COURT: Okay. A response?

11:56 MR. HALES: Our response is that there's just no testimony, and there's no ruling of the Court that would allow for reading a low voltage differential signal channel to require disclosure of an entire suite of technologies as exists in PCI Express and USB 3.

11:57 If a metaphor would help, Your Honor. If our claim is on a tire and we say Ford vehicles have tires, we don't need to enable the -- the vehicle itself. And allowing this graphic in front of the jury would present to them a legal theory that is just at its core unsupportable.

11:57 THE COURT: Well, as I understand it -- I mean, I understand the legal theory, and I don't think there's a problem with it. It seems to me if the defendant puts this on, then -- and you had it in his report, then your expert will be able to explain to the jury why he's wrong.

11:57 MR. HALES: And he intends to, Your Honor.

11:57 THE COURT: Well, then that's how we'll deal with it. I mean, and the jury can decide which -- who they believe.

11:58 Is there anything -- so I'll overrule the

objection with regard to those slides having that.

Now, I will say that the defendant needs to make clear that it's the expert who is overriding this. I mean, I don't know how graphically you plan to do that. Certainly you need to make clear that --

MR. BURESH: That's his graphic.

THE COURT: The graphic cannot intimate, for example, that I think it's the same or that that's -- I'll be listening to how you put it on.

But you have to make clear that this is your expert's opinion. And I hope he's in here and he's hearing me saying this.

This is his opinion of what they are saying, and if they are saying this, then it's not enabled.

And if you do that, then when their expert -- when the plaintiff's expert gets on, he can say "nuh-uh" and explain why you're wrong.

MR. BURESH: Fair enough, Your Honor. Thank you.

MR. HALES: I may not use that language, but yes. We'll do so.

THE COURT: Whatever language you choose to use will be fine with me.

Is there anything else we need to take

11:59 up?

11:59 MR. BURESH: No, Your Honor.

11:59 MR. HALES: No, Your Honor.

11:59 THE COURT: Okay. So we're off the record.

11:59 (Off-the-record discussion.)

12:00 THE BAILIFF: All rise.

12:00 (Recess taken.)

01:22 THE BAILIFF: All rise.

01:22 THE COURT: Please remain standing for the jury.

01:22 (Jury entered the courtroom.)

01:23 THE COURT: Thank you. You may be seated.

01:23 If the witness could return to the witness box, please.

01:23 BY MR. BURESH:

01:23 Q. Welcome back, Dr. Edwards.

01:23 A. Thank you.

01:23 Q. Let me start here.

01:23 Did -- outside of the context of the litigation we're here on, the ACQIS litigation, had you ever heard of Dr. Chu before?

01:24 A. No. I've never heard of him.

01:24 Q. Outside the context of the ACQIS litigation,

have you ever heard of the company ACQIS?

A. No.

Q. Have you ever had any knowledge of Dr. Chu's Interputer?

A. No. Never heard of it.

Q. Or iMod?

A. No.

Q. Now, in addition to the teaching you described to us before lunch at Columbia, you also do some consulting work; is that correct?

A. That's correct.

Q. That's the type of work you're doing here?

A. Exactly.

Q. How often do you do this type of consulting work?

A. One, maybe two a year, or something like that.

Q. Like, how much of your time do you spend on it?

A. Try to keep it around 10 percent.

Q. Why don't you do more of this type of work?

A. Mostly love teaching. I love being in the university. This is interesting too, but that's my home.

Q. Now, before this case, I had asked you about the ACQIS parties.

Have you ever heard -- or let me ask it this way: Had you ever worked with ASUSTeK?
A. No. I have not.
Q. You'd heard of their products before, though?
A. Yes. I have.
Q. Have you ever worked with me or my firm before?
A. No.
Q. Now, as a consultant doing what you're doing here today, are you paid for your time?
A. I am.
Q. How are you paid? On what basis?
A. By the hour.
Q. Does the fact that you're paid hourly for your work, does that impact the analysis you conduct or the conclusions you've reached?
A. Not at all.
Q. Does your compensation depend on the outcome of this case in any way?
A. It does not.
MR. BURESH: If we go ahead and publish the slides, Ms. Clark.
Thank you.
BY MR. BURESH:
Q. Did you prepare a set of slides to assist you

in your testimony here today?

A. Yes.

Q. And are they on the screen in front of you as well as the jury?

A. Can't speak for the jury, but they're definitely in front of me.

Q. Fair enough.

All right. At this point, how many patents are at issue in this case?

A. I believe we're at two.

MR. BURESH: If we could go to the next slide, please.

BY MR. BURESH:

Q. Could you describe for the jury what it -- the concept, let's start there, of a person of ordinary skill in the art? What's that about?

A. Yeah. So in patent law, the idea is that you've got a person who should be able to understand and implement the patent. And they call this a person of ordinary skill in the art.

And so in each case, we're asked to come up with, okay. What kind of background would that person be -- have?

Q. Okay. And what time frame is important from the perspective of a person of ordinary skill in the art

art?

A. So it's when the original invention was performed.

Q. And in that case, what time frame is that? In this case, what time frame is that?

A. In this particular case, 1998/1999/2000 time frame.

Q. Why is the perspective in that time frame important in a case like this?

A. Well, there's two things. One is the law tells us, but I think you'd mentioned earlier -- well, so there are people years, there are dog years, and then there are computer years.

Three computer years is like 30 human being years. So I've seen I don't know how many lifetimes in that period of time. Things change really quickly.

And to understand this invention, you really need to think about, well, what did it mean in 1998/1999? Because the landscape's changed completely in that time.

Q. Okay. We've talked about the time frame. What is the level of training or experience that you would think a person of ordinary skill in the art has for this case?

A. Yeah. So a reasonably junior electrical

engineer. So concretely somebody who has a master of science degree in electrical engineering, computer science, or a related topic, or somebody who just graduated college with a bachelor of science but then worked in industry doing something like that for three years.

Q. Were you a person of ordinary skill in the art in 1999/2000?

A. I was.

Q. Did you perform the analysis that you've performed in this case from that perspective?

A. Absolutely. It's very important to do so.

Q. Could you summarize for the jury the primary questions you were asked to analyze in this case?

A. Certainly. So there are three of them. First one is: Does ASUSTeK use what Dr. Chu is claiming is his technology?

Second question is: What did he actually possess in 1999/2000? What -- the patent says something. What does that patent actually say?

Now, the third question is: Could a person of ordinary skill in the art pick up Dr. Chu's patents and make it, build the invention that he was describing? Is there enough information there?

Q. Now, the second two questions are a little

01:29 more involved in their answer, but as to the first one: Just summarily, what did you find in this case?
01:29 A. Right. So ASUSTeK does not use what Dr. Chu is claiming.
01:29 What invention did he possess? That's a detailed one.
01:29 For the third one, well, we saw something earlier and it's much closer to that. And in particular, it's not the stuff that ASUSTeK is practicing for the third point.
01:30 MR. BURESH: If you'd go to the next slide, please. Slide 5, please.
01:30 BY MR. BURESH:
01:30 Q. Now, in the process of conducting your analysis in this case, briefly describe to the jury the types of materials that you considered.
01:30 A. Yeah. So there are a lot of them. I won't rattle them all off, but a lot of stuff from ACQIS, patents, the records for the Patent Office. I've read a number of Dr. Chu's depositions, documents about National Semiconductor's LVDS. We've seen some of those already. Looked at the reports of Dr. Sarhan and some of the stuff he relied on.
01:30 Then the other column here is sort of, you know, outside, these are the local -- the PCI local bus

standard, the PCI Express standard, all of these things we've seen before -- you've seen before.

Some documents from Intel. I spoke with Mr. Bhatt, who you saw this morning, and I've examined the accused technology itself.

Q. Okay.

MR. BURESH: Next slide, please.

BY MR. BURESH:

Q. When were the asserted patents -- the two asserted patents that are here, when were they filed in this case?

A. Right. So the asserted patents are way the heck over on the right here. So 2013, 2014.

Q. Okay. And what was the -- going back to the beginning like we've talked about, where do we need to go for that?

A. Right. So the parent of all of these was back in 2000. And that includes this provisional application I think's been spoken about a little bit from 1998. So 1998 and 2000 are the -- when it started.

Q. Okay. And again, for your analysis, why is it important to go back to these earlier documents and take a look at those?

A. Well, like I say, what these patents mean

today versus what they meant then, it's very, very different. And the question is: Well, what did they mean then? What did he actually invent? What should he get credit for?

Q. This is a previously admitted Exhibit J-35.

Can you tell the jury what this is?

A. Yeah. So this is that provisional patent. So that was the thing on the far left of the -- far left of the timeline.

Q. Okay. And what does it mean to be a provisional patent application?

A. So I think of it as sort of a foot in the door. You're notifying the Patent Office what it is you're planning to invent, but you haven't -- you know, going back to the post analogy, you haven't put the posts in the ground yet. You just applied for a construction permit.

But you've got to say what it is you're going to build, what your invention is.

Q. Okay.

MR. BURESH: Back one, please.

Thank you.

BY MR. BURESH:

Q. Looking at the title of the provisional patent application, what's the title describing?

A. So you can see it there at the top, Computer Console with a Universal Attached Computer Module. So that's what we've been talking about the whole time here, and we saw it a couple days ago.

It's this business console. You plug this attached computer module into it, and then you got a computer system.

MR. BURESH: Next slide, please.

BY MR. BURESH:

Q. And again, at a high level, what was Dr. Chu describing as his invention in the provisional patent application?

A. So it's consistent with the title. So it's this modular computer system. You do things like take an ACM, plug it into the console. That's this big green thing. And there's this bay that I'm going to mark in yellow going forward.

And you could do that with a desktop machine, something that would sit on your lap, you know, same configuration over here.

Q. Okay. What was the point -- we heard some -- I believe we had it up here earlier in the case.

And what was the point of the overall invention? What was the purpose?

A. Yeah. Yeah. So yeah. I think this has been

mentioned a number of times now. This was back when you -- networking was difficult and all the rest of it.

The idea was that if you wanted to bring work home with you, you would take the attached computer module out, carry it home, and then plug it into your home machine and continue working there.

And then the next morning, you'd unplug it, bring it with you to work, and plug it back in.

Q. Now, are these devices, these modular devices that Dr. Chu described in this provisional application, are they the same thing as what ASUSTeK is selling today, the accused products?

A. Not at all.

Q. How are they different?

A. They're not modular computers, right? If you want to bring your computer home, you can pick it up and carry it with you. Laptops are really light.

MR. BURESH: You can go to the next slide, please.

BY MR. BURESH:

Q. What was Dr. Chu's idea for the interface between his ACM, attached computer module, and his peripheral console?

A. Right. So that's this XIS Bus. That's the yellow thing in between. So that matches up with the

01:35 colors I'm using here.

01:35 So the yellow bit is the slot for the computer
01:35 that's on the left, and it goes on the console. That's
01:35 the green thing on the right.

01:35 Q. Okay. Now, what part of the XIS Bus are we
01:35 primarily focused on in this case?

01:35 A. So we -- I'm sure you've heard this many times
01:35 now. This is this XP Bus that's part of the XIS Bus,
01:36 the thing drawn at the bottom.

01:36 MR. BURESH: If you can go to the next
slide, please.

BY MR. BURESH:

01:36 Q. I want to focus in on the ACM on the left-hand
01:36 side.

01:36 Do you see that in front of you?

01:36 A. Yes.

01:36 Q. What components of a typical 1998 computer
01:36 system would be contained in the attached computer
01:36 module?

01:36 A. Yeah. So main things, the CPU, so I've heard
01:36 this called the brains of the computer. It's where the
01:36 arithmetic is done, where the program is executed.
01:36 It's the most important part.

01:36 We heard about the north bridge and the south
01:36 bridge from Dr. -- from Mr. Bhatt this morning. These

01:36 are things that facilitate communication within this attached computer module.

01:36 Another phenomenally important thing is the memory. This is where you store the programs and all the data. And this -- here it's drawing integrated graphics. So it has a way of displaying cool stuff.

01:37 Q. If we move to the right-hand side of this figure.

01:37 What was the purpose of the peripheral console in Dr. Chu's disclosure?

01:37 A. Well, the title is a dead giveaway. It's the peripheral console. And so what it does is provide you a way to connect up peripherals to your computer. So this would be a keyboard, mouse, display, other hard drive. Here, it's drawing a CD-ROM. These things.

01:37 And the point is, is that you would not have to drag these to work and home each day. You would just drag the attached computer module.

01:37 Q. Let's use the mouse and the keyboard and the monitor as an example.

01:37 Where do you connect those into the system disclosed in Dr. Chu's provisional application?

01:37 A. Right. So back in 1998, mice and keyboard used an early form of the USB that we were talking about this morning. And so you can see them plugged in

01:38 over here to the peripheral console.
01:38 Q. What about an external hard drive? Where
01:38 would that plug in?
01:38 A. Let's see. So you might put it on USB. If
01:38 you have a really fancy external hard drive, you might
01:38 plug it into the 1394 port or maybe you'd put it onto
01:38 the PCI bus that was in the peripheral console.
01:38 Q. Okay. Going to the next slide, how did
01:38 Dr. Chu in his provisional patent application describe
01:38 the XP Bus?
01:38 A. Right. So throughout -- and let's see. I've
01:38 already got it highlighted two ways here, but it's a
01:38 way -- it's worth doing more.
01:38 He described it as a peripheral bridge bus.
01:39 So an XP Bus actually has that enshrined in it. Cross
01:39 peripheral bus. That's what the name means. And he,
01:39 you know, uses this expression "peripheral bridge bus"
01:39 repeatedly because that's what it is.
01:39 Q. Why is it called a peripheral bridge bus?
01:39 A. So if you look at the bottom here, we've got
01:39 the XP Bus in the middle. What it is doing is bridging
01:39 these buses in the ACM and these buses over on the
01:39 peripheral console.
01:39 Q. Okay. Now, those lines you circled there on
01:39 the left and the right, the PCI 1394 and USB and

et cetera, you see those?
A. Yes.
Q. What are those called?
A. So those are the peripheral buses or buses.
Q. Why are there so many of them in a figure like this?
A. Well, they have different buses for different purposes. So PCI, you've -- you've held in your hand earlier. Again, this was 1998. So this is PCI local bus we're talking about. Those are where you plug in cards like the one you held earlier.
USB, this was an earlier version of USB at the time. This was more suited to plugging in keyboards and mice. And it didn't make sense. You don't plug a mouse into a computer with a big slot like that. You want something tiny.
1394 was a high-speed bus usually used for video at the time. It was sort of barely able to handle that. And the rest each had different purposes.
Q. Okay. When you see PCI at the top, what does that stand for?
A. You're referring to the PCI at the top of the red?
Q. Yes.
A. Yeah. So peripheral component interconnect.

And as of 1998, 1999, this was specifically the PCI local bus that Mr. Bhatt was talking about this morning.

Q. Okay. Focusing in on the host interface controller on the ACM, Dr. Edwards, what is that doing?

A. So let me take this moment to reinforce the bridge analogy.

So in computer engineering, these things -- this is referred to as a bridge bus. We talked about that.

Well, sort of interesting. I sort of look at it as, you know, here are two piers. We've got the bridge deck, and there's something in between. Right?

I realized, as I was walking over the Waco Suspension Bridge a couple days ago, this is exactly what we have. This is what we have here.

So what is the host interface controller? Well, it's taking these buses here -- think of them as the local streets of Waco here -- and converting them so you could walk over that bus -- excuse me -- walk over that bridge.

And, you know, technically, if you want to talk in more detail, it's taking the PCI transactions, the details of that, and converting it into something that can walk over the -- you know, walk over the XP

01:42 bridge bus.

01:42 Q. Would the host interface controller be doing the same thing for USB, converting it and putting it onto the XP Bus?

01:42 A. Exactly. So the purpose of all of this is each one of these gets converted somehow, sent over the XP Bus, and then reproduced on the other side.

01:43 Q. Okay. And moving to the right-hand side, the peripheral console, what is the bay interface controller doing?

01:43 A. So it's doing exactly the opposite of the host interface controller. If something starts off on the left, the purpose of these two things, the bay interface controller's taking the people walking across the XP Bus, if you want, and turning them back into these various buses on the far side. So, you know, PCI -- PCI, 1394, that lot.

01:43 Q. Okay. So just to summarize, can you explain one more time why the XP Bus is operating as a bridge bus?

01:43 A. So like I say, the Waco Suspension Bridge is a wonderful model for this. I went down there. There's this plaque that says 150 years ago, it carried people, wagons, and cattle. And I looked at it.

01:43 Well, okay. We don't have people, but we have

PCI. Let's see. Wagons, yeah, 1394 is close to that. USB, maybe that's a little bit more like cattle.

It's taking all of those things, transforming them, moving them across a river -- this would be the river, the middle -- and then letting them get out on the other side.

Q. Bringing you back into the context of technology if we can, let's say I have --

MR. BURESH: Go to the next slide, please.

BY MR. BURESH:

Q. -- a mouse connected to the peripheral console.

Do you see that?

A. Yes.

Q. How would the mouse and the CPU on the attached computer module, how would they talk?

A. Okay. Okay. So here we go. This is computer architecture 101. So --

Let's see. Is this working today? It is not. Ah, there it is.

Okay. So that starts with the CPU -- some software in the CPU saying, oh. I'd like to find out whether the mouse has been clicked.

That turns into a request to, you know, hey.

Send me some information. That goes into this north bridge chip that you heard Mr. Bhatt talking about earlier.

That north bridge sends that request down to the south bridge. The south bridge looks at that and says, hey. The software wants to talk to the USB -- to the mouse on the USB bus.

So it figures out how to speak USB, sends that over, this little segment of the USB to the host interface controller.

Now, the host interface controller picks up that request in USB format, converts it to its own style of transmission, sends that across the XP Bus. That reaches this bay interface controller in the peripheral console.

It undoes that compression and various other things that it had to do, turns it back into something the USB can understand, and then that makes its way to the mouse.

It says, oh. Right. Oh, you want to know about the click? It's not clicked yet. Boy, that was a lot of work.

Q. Now, is the XP Bus a USB interface in that scenario?

A. Absolutely not. And one way to tell is if I

took this mouse and tried to plug it into the XP Bus, it would not work. They're speaking a different language.

Q. Now, as a person of ordinary skill in the art in the 1999/2000 time frame, would you have considered what Dr. Chu was trying to do to be a technologically good idea?

A. Not especially.

Q. Why not?

A. So if you want to get from Point A to Point B, do you want to cross a bridge, or would you like to not bother crossing a bridge? Well, I'd rather not cross a bridge, as beautiful as it is.

This one is no different. All this conversion stuff that happens both in the host interface controller and the bay interface controller takes time, and time -- you don't want to waste time when you're computing -- when you're using a computer. So all of this just slows things down. It doesn't help.

You'd much rather be able to, you know, talk directly from USB over to the mouse. That's a lot quicker. But Dr. Chu didn't -- had introduced a -- I'll call it a river down the center. It slowed everything down.

Q. What technology did Dr. Chu describe for his

XP Bus?

A. So this is implemented using a technology called LVDS that we've heard about a number of times now.

MR. BURESH: If we could pull up Defendants' Exhibit 950. It's previously admitted.

BY MR. BURESH:

Q. What is the -- what is Defendants' Exhibit 950, Dr. Edwards?

A. So like it says on the front, this is the LVDS owner's manual, and it's published by a chip company called National Semiconductor. And you'll notice the publication date here, spring 1997.

Q. Did you hear Dr. Chu testify that he principally gained his knowledge of LVDS from this document?

A. Yes. I recall hearing that.

Q. What is the LVDS owner's manual?

A. So National Semiconductor is a chip company. They sell integrated circuits. The way that works is they want to encourage engineers to use their chips. So they'll go and buy a bunch.

And the way you do that and the way you did that at the time is you put out books and data sheets like this, essentially instructions on how to use their

product. So what this contains in it is detailed description and instructions on how to use LVDS.

Q. Was LVDS off-the-shelf technology by the spring of 1997?

A. Oh, yeah. It had been for quite a while, in fact. This whole book is going to use these chips that we've been selling for a while, we know work quite well. Here are all the wonderful advantages of them.

MR. BURESH: Now, if we could blow up the -- thank you -- the image.

BY MR. BURESH:

Q. In the context of what Dr. Chu was disclosing in his provisional patent application, why would the technology -- the LVDS technology from National Semiconductor be of interest in that context?

A. Oh, well, it's really simple. Everybody see the bridge? It's right here.

This diagram at the bottom, we're looking down at it from the top, right?

We've got our people and wagons and cattle or whatever. They get converted through the National chip into LVDS. And this is great. They even drew -- they even drew the river in blue, right?

This is exactly the kind of bridge stuff we were just talking about, where it picks it up for one

01:50 chip, sends it over this LVDS channel, and then converts it on the other side.

01:50 And you can see on the other side, you know, all the various things crossing the bridge come back out.

01:50 So here, we have on the cover of this book by a company called National Semiconductor the LVDS bridge.

01:51 MR. BURESH: If we could go to Page 6 or to the next slide that has Page 6 already on it.

01:51 BY MR. BURESH:

01:51 Q. What are we seeing here, Dr. Edwards?

01:51 A. Yeah. So this is a figure inside the owner's manual on the right. And it's depicting the same thing as this more fanciful drawing on the -- on the left.

01:51 But it's just saying the same thing. It's pointing out LVDS, it goes down to four or five channels. The TTL is, you know, 21 or 28 on either side. And it's communicating in one direction.

01:51 And again, this -- when I was walking across the Waco Suspension Bridge, this reminded me of it again. It's a fairly narrow bridge, right? You couldn't drive like two modern semi trucks across it or something like that. Must have been challenging to move the cattle.

01:52 Q. All right. This depiction from Slide 6, if we compare that to the depiction in Figure 11 of the provisional patent application, how do they compare?

01:52 A. They match perfectly. So PCI here is -- PCI here, we heard talking of a parallel bus this morning. Well, that's exactly what goes in, you know, 21 or 28 channels. You need a few more to do PCI, but similar.

01:52 Serialized, that's what the host interface controller is doing. We have the XP Bus implemented using LVDS, four or five channels. Again, narrow bridge.

01:52 And then the receiver at the other side recovers that data that came in on the left, say, in the form of PCI.

01:53 Q. Now, this figure from Page 6 of the LVDS owner's manual, the arrow's only going in one direction, from left to right, correct?

01:53 A. That's correct.

01:53 Q. If you wanted to send data in both directions, this unidirectional and opposite directions, that concept, how would you do that?

01:53 A. Yeah. So all of you know if you've ever driven, right, the thing on the top, it's a one-way street. How do you go the other direction? You go to the next street over, which may be one way the other

direction. It's the same thing.

National says, oh, go buy another couple of chips, replace -- put the transmitter on this side and the receiver on this side, and you've got stuff going both directions.

MR. BURESH: If we could go to the next slide, please.

BY MR. BURESH:

Q. Actually, before I go there, do you remember the list of -- from -- let me see if I --

MR. BURESH: Could we pull up plaintiff's PDX-3, Slide 32, please?

BY MR. BURESH:

Q. Do you remember seeing these during Dr. Chu's testimony, the benefits of the patented LVDS approach?

A. Yes. And I found them remarkably familiar.

Q. What provides these benefits?

A. Well, the National Semiconductor chips said they provided exactly that.

MR. BURESH: Could you pull up 950, DX-950, Page 5, and put them side-by-side with this slide, if you can?

BY MR. BURESH:

Q. Now, this is coming out of the LVDS owner's manual on the right, correct?

A. Yes.
Q. Okay. There we go.
MR. BURESH: Thank you. Page 5.
BY MR. BURESH:
Q. In this section down below --
MR. BURESH: Derek: Saves money too.
Thank you.
A. Yeah. There we go.
BY MR. BURESH:
Q. Do we see the same benefits being provided by National's LVDS owner's manual or described in National's LVDS owner's manual?
A. Yep. Absolutely.
THE WITNESS: So, in fact, Derek, let me draw.
A. So smaller connector, you know, less expensive. Okay.
Let's see. Using low cost, off-the-shelf, so those are -- that's close.
Low noise producing, noise-tolerant technology. That's a complicated way of saying fewer errors.
Faster operation, it's mentioning it down here.
Here, it's saying: Reducing board connector

01:56 and cable costs, that's smaller connector.

01:56 Longer battery life. LVDS consumes very little power, so power supplies, fans, and batteries can be reduced or eliminated.

01:56 They're saying the same thing.

01:56 BY MR. BURESH:

01:56 Q. So the value that Dr. Chu described in his patent of his invention is the same value that was already provided and discussed in the LVDS owner's manual; is that correct?

01:56 A. That's correct.

01:56 MR. BURESH: If we can go to the next slide, please.

01:56 BY MR. BURESH:

01:57 Q. This is back from the May 1998 provisional patent application, correct?

01:57 A. Correct.

01:57 Q. What is being shown in Figure 8 of the provisional application?

01:57 A. Let's see. So this is a particular embodiment, so this is one way Dr. Chu is proposing you could implement his patent.

01:57 And it lays it out down here. It's describing an "Attached Computer Module with Integrated CPU/NB/Graphics and Integrated HIC/SB."

Q. What does it mean to integrate components?

A. So integration is one of these things that I would say all electrical engineers love. And it's really funny. You know, it sounds like it's really a complicated thing, and Intel's made an enormous amount of money about it. But you already know what it is.

So I don't know about you, but I like ordering things from Amazon. Unfortunately, I order probably too many things from Amazon.

Now, if you order a bunch of things from Amazon, there's a couple of things that can happen. One is they ship each box to you one at a time. The other thing is they realize, oh, Stephen's ordering a bunch of these. They get a bigger box. They put the smaller boxes in it, and they ship the bigger box.

The bigger box is integration. That's all it is.

The computing industry, the electronics industry's been doing that for over 50 years. And what it does, it's giving you bigger boxes, you can put more things in them. But it turns out that when you do that, it gets cheaper, just as it's usually cheaper to ship one big box than two small ones.

So it's as simple as that. Integration just means putting two boxes together or multiple boxes

01:58 together.
01:58 Q. Now, in Figure 8, for example, there is the south bridge and the host interface controller that have been put into the same box, correct?
01:59 A. Yeah. This -- that's this box here.
01:59 Q. Does that change the operation that we've looked at previously?
01:59 A. No. When Amazon ships you two things in a box, you really hope they don't break what's going into those two boxes, right? It's just a bigger box. So nothing changes.
01:59 Q. Other than this caption, is there any other discussion in this provisional patent application for any changes that might be depicted in this diagram?
01:59 A. Not at all.
01:59 MR. BURESH: You can go to the next slide, please.
01:59 BY MR. BURESH:
01:59 Q. Now, here we have -- we've moved Figure 8 to the right. And now we're looking at -- in comparison to Figure 11 that we looked at originally, correct?
01:59 A. Correct.
01:59 Q. How does the figure on the right compare to what we originally looked at with Figure 11?
01:59 A. So this is a different level of integration.

So before, we were looking at this Figure 11. Remember, all the funky colored buses.

Well, to get to Figure 8, we're just integrating all of the green things here and marked them -- marking them with the dotted. That just goes right over here. That's the integrated south bridge host.

But similarly, this blue box on the right, integrated CPU or CPU module, north bridge, and graphics accelerator, well, that's just turning these three boxes into a single box.

Q. Does that change the operation of what's depicted at all?

A. No.

Q. Now we have Figure 9 from the provisional application on the screen in front of you, correct?

A. Correct.

Q. What's being shown here?

A. We made the box bigger again. We took the two boxes from the last slide, these two, and merged them all into this one big box.

Q. Does that change the operation of what's depicted in any way?

A. Again, no.

Q. And again, is there any discussion in the

02:01 provisional of this figure other than the caption?

02:01 A. No.

02:01 MR. BURESH: Next slide, please.

02:01 BY MR. BURESH:

02:01 Q. Going to do the same exercise briefly because I think we're covering this well.

02:01 But Figure 11 on the left, Figure 9 on right. How do they compare?

02:01 A. Yeah. Again, it's just -- we're talking about putting things in boxes. So what's drawn here on the left is what we saw earlier with all the bits and pieces, Version -- Figure 9 here is just saying, okay. Take all this stuff in the blue dashed box, turn it into one big box.

02:02 Q. And focusing our attention on Figure 9 on the right, what is the XP Bus bridging in this depiction?

02:02 A. So in this depiction, we could assume that there's the host interface controller still, right? It's in the box. It was in the box over here. It just got moved.

02:02 But when they drew the picture on the right, they didn't bother putting in the contents of the box. That's the point of drawing a bigger box.

02:02 So it's bridging the PCI bus that that host interface controller needs to be connected up to with

the peripheral bus.

MR. BURESH: If we could go to the next slide, please.

BY MR. BURESH:

Q. Now, in Figure 9, is the peripheral bus -- I'm sorry -- the XP Bus, is it still going to a peripheral console?

A. Yes. It is.

Q. Even though it's not depicted?

A. Yeah.

Q. How do you know that?

A. Well, what's great is, again, all we have to do is look at the name, right? Remember, it's ACM. What's the A for? Attached. What is it attached to? Console.

That's what -- that's what the XP Bus is for. It's for attaching to a console. So we can be assured, even though it's not on this diagram, we've got a console over here.

MR. BURESH: If we go to the next slide.

BY MR. BURESH:

Q. Now, the colored buses, PCI, USB, that we see in Figure 11 --

A. Yes.

Q. -- we can't see those in Figure 9; is that

fair?

A. That's correct.

Q. Are they still there?

A. Yes.

Q. How do you know?

A. We just had this discussion. When we go from the detail boxes, when we integrate these boxes on the left to the right, we don't change what's in there. We just put -- we just put multiple boxes on the same chip.

Q. Okay. And we discussed that the captions are the only discussion of Figures 8 and 9, correct?

A. That's correct.

Q. Why is that important?

A. Well, so if somebody was packing a box with boxes, they could choose to break each of those boxes or change them as they put them into the larger box, but you generally don't do that unless somebody tells you specifically to do that. Dr. Chu's not telling us to do that.

Q. In the May 1998 provisional, J-35, does Dr. Chu describe his X bus as being anything other than a peripheral bus bridge?

A. No. He's very consistent starting just with a name, peripheral bridge bus. Peripheral bridge bus.

And you'll find that throughout that document. XP Bus, cross peripheral bus, that's what it is.

Q. Did Dr. Chu ever describe using his XP Bus to connect directly to, like, the mouse we were looking at previously?

A. No. That wouldn't make any sense.

Q. Why not?

A. The mouse wouldn't know how to understand the XP Bus. The mouse was expecting USB, which is something else. Even if you could physically connect them up -- I doubt you could -- the mouse would say, what is this? I don't know what's going on. The XP Bus would say, I don't understand what's being said.

Q. Now, the buses on the left, PCI, 1394, USB, did Dr. Chu ever describe using his XP Bus to replace any of those buses?

A. Never to replace.

Q. What's the difference between a bus like USB and a bridge bus?

A. Sure. A bus, like PCI local bus as of 1998, the USB, these connect peripherals to a computer. Mice, keyboard, hard drives. Stuff like that.

A bridge bus, just like a bridge, connects two buses. Right? If you've -- if you run across a bridge in real life, it's not a normal road. It's connecting

two banks of something. It's you're crossing over something. That is exactly what a bridge bus is, and that's exactly what the XP Bus is.

MR. BURESH: I want to look at another figure now. If we go to the next slide, this is Figure 15 from the provisional application.

BY MR. BURESH:

Q. When Dr. Chu wanted to connect his computer to a USB device, like a keyboard or mouse, what type of connection did he use?

A. Yeah. So this is unusual because there's no console in this. But he's saying, okay. This is a USB port, which means this is -- almost in -- with this. This is a USB cable. And that should say "cable" not "gable." But okay. You get the idea.

Anyway, it's a USB port. What do you plug into USB ports? USB cables.

Q. When Dr. Chu's patent disclosures use the term "USB," do they ever call it an LVDS channel?

A. No. That would have been crazy.

Q. Describing his LVDS channels, do Dr. Chu's patent disclosures ever call them a USB link?

A. No. Not at all.

Q. What does this image indicate to you with respect to the comparison between a USB link and

Dr. Chu's LVDS channels?

A. Well, like I said, these LVDS channels, they were being used as a bridge bus. Dr. Chu knew that. He knows what a bridge bus is.

Here, USB is being used to connect peripherals to the computer, the keyboard and mouse being connected up. XP Bus never did that. He never connected to a peripheral.

MR. BURESH: If we go back to the timeline now.

BY MR. BURESH:

Q. What's the next important point or date on the timeline?

A. So that would be when the patents at issue in this case were filed.

Q. And specifically, the parent patent. When was it filed?

A. Oh, I'm sorry. Yeah. Okay. Yeah. The parent patent.

So we were talking about the provisional here in May 1998. Two years later, Dr. Chu filed this parent patent that will eventually -- that eventually turned into the patents at issue in this case.

MR. BURESH: Your Honor, I move to admit J-58, please.

MR. HALES: Can you further explain what J-58 is? I didn't catch it.

MR. BURESH: Sure. It's the May 2000 parent patent.

MR. HALES: No objection.

THE COURT: Admitted.

BY MR. BURESH:

Q. Looking at the May 2000 patent filing, what is the subject matter of that parent patent?

A. So easiest thing to do is look at the title of the patent here, which I've blown out. And it's this modular computer system that we've been talking about the whole time. So a computer system and method, including console housing multiple computer modules.

Q. Okay. And how did Dr. Chu depict that concept in this patent?

A. So very similar to what we've seen before, we've got the console here in green in the middle. And the only difference here from what we've been talking about before is now we have two ACMs plugging into the console instead of just one. And you can see there, there's a pair of yellow -- yellow bays where it would plug in.

Q. Okay. So this parent patent was still dealing with an attached computer module, or actually two of

them, and a peripheral console that could receive those?

A. That's correct.

MR. BURESH: We could go to the next slide, please.

BY MR. BURESH:

Q. Now, we've been looking at a series of figures from the provisional application, fair?

A. Yes.

Q. Are those figures in this parent application?

A. So in a manner of speaking, so if you go looking at the physical document, you won't find them. Instead what you will find in the text of the patent is this expression "incorporated by reference for all purposes."

Q. And what does "incorporated by reference" mean?

A. So what it means is if you're going to read this patent, what you should do is go and get this other document and staple it to the back of your patent and read the whole thing.

Q. So it's like it's there even though it's not on the face of it?

A. It's telling you, you need to go to this extra effort to understand what this patent actually is. Go

and get this other document, staple it in the back.

MR. BURESH: If we can go to the next slide, please?

BY MR. BURESH:

Q. Coming back to the timeline, let's move up to the asserted patents.

I believe Dr. Sarhan focused on the '768 patent. So I'm going to ask you to do the same.

When was that filed?

A. Yeah. So that's this one over here that was filed March 13th, 2014. It's the '768.

Q. And it relates back to the May 2000 parent, correct?

A. Yes. Yeah. Both of these trace their lineage all the way back to that May 2000 patent.

Q. Okay. Now, the jurors have the asserted patents in their binders.

Do you have a binder with patents in front of you?

A. Yes. Yeah. I have what I believe to be similar to the juror notebook that you have in front of you.

Q. Is there Exhibit J-1, the '768 patent in there?

A. Yeah. That's -- I believe that's the first

patent in the collection. I don't know if this one got shuffled, but you can see it pretty easily.

Q. Okay. Why don't you pull that out of your binder?

MR. BURESH: And I would invite the jury to follow along, if you want to.

A. Yeah. Absolutely. A little show and tell here.

BY MR. BURESH:

Q. Okay. So, Dr. Edwards, I just want to walk the jury through the parts of a patent so we can kind of finally see what we've been talking about for three days now.

A. Absolutely.

Q. All right. Let's start with an easy one.

Where are we going to find the patent number?

A. So the patent number, if you look here -- and he's got it highlighted as well -- upper right-hand corner of the page. And you can see it actually says "Patent No." And it starts U.S. 9,529, and then 768.

There are too many digits in most patent numbers. So we usually abbreviate using the last three digits. So this is indeed the '768 that we've been talking about.

Q. And where would we find the title of the

02:14 patent?

02:14 A. So that's on the left. And it's immediately under the inventor's name, Chu, and it's this little thing marked 54 that starts: Computer system including CPU or peripheral bridge.

02:14 Q. And while we're on the title, it's referring to a bridge, correct?

02:14 A. It is.

02:14 Q. Is that the bus bridge concept?

02:14 A. Absolutely.

02:14 Q. Okay. How about the figures? We've looked at figures in a variety of documents. I'm going to have to pull out the rest of the patent, but can you show the jury where they'll find the figures?

02:14 A. Certainly. So on the front of most patents, there's one figure. But that's just the beginning. If you go in -- let's see. Oh, this one does have page numbers on it.

02:14 So it starts at the page labeled J-1-15 at the bottom. And at the top you can see Sheet 1 of 35. And 02:15 this is where the figures begin. So there's a -- like it says, there's 35 sheets of figures one after the other here. And many of these should be familiar to you by now.

02:15 Q. So that's the figures.

What about the written description or the words describing the invention?

A. Right. So every patent is -- that I've ever seen is structured like this. You've got the face with the title. You've got a fair number of figures, usually. And then the written description begins. So it's after the figures. So with this one, it's labeled J-1-50 at the bottom.

Q. Okay. Now, I see that there's -- in the written description, there's numbers above the left column and the right column.

A. Yeah.

Q. And then there's a series of numbers down the middle, right?

A. Yeah.

Q. Describe to the jury how those numbers work to help us locate content within the patents.

A. Right. So here we're kind of lucky in that we actually have page numbers at the bottom. Those usually aren't there.

Instead, to talk about the location of something within a written description, basically, you know, some word or sentence or paragraph, something like that, the numbers at the top indicate the columns.

So on J-1-50 at top, you see 1, 2. And then

02:16 you turn to the next page, 3, 4, and so forth. That tells you what column you're in.

02:16 The little numbers between the columns tell you what line is each one. So there's no 1. But if you look at 5, that is, in fact, the fifth line from the top. There's a 10, and that's the tenth line from the top, and so forth.

02:16 So we might say something like, oh, Column 2, Line 14, that's where another paragraph starts.

02:16 Q. Okay. Now, let's do a little exercise with that. Back to the patent, please.

02:17 Let's say there's some disclosure that we want to look at -- and we've actually looked at this previously in the case. But just so we can all do the exercise together, if we want.

02:17 Let's go to Column 5.

02:17 A. Yep. Oh, I'm not supposed to do this, so I'll help you cheat. It's labeled J-1-52 at the bottom.

02:17 Q. Now, if we want to look at disclosure that starts at Line 19, give ourselves a second and then how does that start?

02:17 A. Right. So Column 5, Line 19?

02:17 Q. Uh-huh.

02:17 A. Right. So Column 5 was on the left side of that page. And you look down -- well, there's no 19,

but of course there's a 20.

Q. Need to back up from the mic just a little bit.

A. And so it looks like Line 19, just above 20, is a paragraph that starts with: The present invention encompasses an apparatus for bridging a first computer interface bus and a second computer interface bus.

Q. Okay. Now, is that paragraph that we've just done this exercise with, what is that saying about the invention that's disclosed in the '768 patent?

A. Well, there's our bridge. It's saying present invention, that's everything. That is the patent saying, hey. This is what I invented. It's an apparatus for bridging a first computer interface bus and a second interface bus.

So you remember that picture we were looking at awhile ago and I said it looked like the suspension bridge? Well, PCI -- XP Bus/PCI, that's what this text is telling us is the invention.

Q. Okay. And again, that apparatus, just to be clear, it's also referred to as an interface channel in this paragraph, correct, on Line 25?

A. Yes. See, that's the advantage of these coordinates, right? If you look on Line 25, it starts: The apparatus comprises an interface channel having a

02:19 clock line and plurality of bit lines for transmitting bits.
02:19 So yes.
02:19 Q. And what is the interface channel in this patent?
02:19 A. It's referring to the XP Bus.
02:19 Q. Now, let's complete our patent walk-through.
02:19 If the jury wants to look at the claims of the patent, go past the written description. Where are they going to find the claims?
02:19 A. Right. So the claims are where the inventor lays out a little bit more precisely what he thinks his invention is. There's some technicalities I'm leaving out here, but it's always right at the end of a patent.
02:20 So this patent ends J-1-72. And let's see. You can see the claims ending there. The claims themselves start in Column 40. This is J-1-69. And what is that? Line 36.
02:20 It's this numbered list that starts: What is claimed is...
02:20 And then we've got a bunch of numbered claims one after the other.
02:20 Q. And now we can all say we've looked through the parts of at least one patent, correct?
02:20 A. Quite. Full credit.

02:20 Q. All right. Now, Dr. Edwards, you've looked at these asserted patents, correct?

02:20 A. Correct.

02:20 Q. Is there any disclosure in any of Dr. Chu's patent filings of LVDS channels that are anything other than the channels of a bus bridge?

02:21 A. No.

02:21 Q. The figures from the provisional application that we've looked at, are those incorporated by reference into the asserted patents?

02:21 A. Yes. They are.

02:21 Q. And that means that the jury won't necessarily find them when they're flipping through the '768 patent. They would need to look at the provisional application?

02:21 A. Yeah. That's correct. It's unfortunate that when these binders were put together, they didn't do all that stapling they told you to.

02:21 But you can go and find the "as was incorporated by reference" and it's a long chain, but what that's telling us is that, yes, these figures that we've been showing you from the provisional are supposed to be there.

02:21 Q. And the provisional is J-35, correct?

02:21 A. That's correct.

Q. Have you ever done an analysis before this case as to whether particular products infringe a particular patent claim?

A. Yes. A number of times.

Q. If we could --

MR. HALES: Your Honor, can we sidebar?

THE COURT: Of course.

(Bench conference.)

MR. HALES: So I've been pretty patient allowing him to discuss the background of this -- the asserted patent and the patents leading up to it.

I don't know that I've seen in his noninfringement or invalidity reports what I believe to be the next shoe that will drop, which is: There's no disclosure -- I'm sorry -- to infringe you have to be an LVDS that acts as a bridge or that there's not sufficient written description to lay support for LVDS in any context except for a bridge.

THE COURT: You're saying that's not in his report, right?

MR. HALES: His report is --

THE COURT: Here's what we're going to do. He's going to ask the question. And if you think it's not in his report, you're going to stand up and say, it's not in his report. And then my

instructions -- he has a key next to his question and says, here it is in his report. And he's going to tell you where it is in his report.

MR. HALES: Works for me.

THE COURT: I can't --

MR. BURESH: Do you have a copy of his report, or you want me to bring you up one?

THE COURT: No, no. If you represent to me that it's at page and paragraph, then I'm going to believe you.

MR. BURESH: Thank you, Your Honor.

THE COURT: You just need to do that. Now, it doesn't have to be the exact same quote.

MR. BURESH: Oh, I understand.

THE COURT: And so what I -- what -- this is the test. What -- when I look at it, would I feel that he has prepared -- the other side has prepared for the jury to hear what this man's about to say. That's the big picture stuff.

And if he says it's not in the report and you say, look at Page 69 of Paragraph 8, I'm going to say, overruled.

Because -- now, if he were to look at that and after a number of times think you're not being straight with me, we'll have another discussion up

here.

But for practical purposes, as long as you can tether in the record where you believe it's found, I'm going to overrule the objection.

MR. HALES: Thank you, Your Honor.

(Bench conference concludes.)

MR. BURESH: If we can go to the next slide, please.

BY MR. BURESH:

Q. Describe for the jury, please, using the analogy on the screen in front of us how an infringement analysis works.

A. Right. So we were just looking at claims of that patent. So one of the questions you have is: Does something practice a claim? You know, is it doing what the invention says you have to do if you're doing that invention?

So imagine we had a claim that started off with a ball that was made of leather, stitched together, filled with air, and spherical in shape.

Now, you know, the claims we were looking at, none of them have anything to do with leather, but this way of structuring claims as a sequence of parts, it's a series of parts, is very common and present in the patents you're looking at as well.

And the rule is to infringe, every single one of those parts needs to be there. So, for example, with these claims, a ball made of leather, stitched together, filled with air, spherical in shape, soccer ball practices that. Other balls may too, but we're just doing the analysis for the soccer ball.

But consider a football. Well, football is made of leather, stitched together, it is filled with air, but it's not spherical in shape. It's some weird oblong thing. So the result is, is that a football would not practice this claim because of this one missing part.

Q. Okay. So if even one claim element is missing, there's no infringement?

A. That's correct.

Q. And if there's multiple claim elements missing, there's even more noninfringement?

A. I don't think you can become more noninfringing, right? As soon as you have one, that's all it takes.

Q. Okay.

A. Doesn't matter how many more don't match up.

Q. Now, we've also heard about some of the Court's definitions for certain claim terms, correct?

A. That's correct.

02:26 MR. BURESH: Mr. Palisoul, could you pull up the Court's claim constructions?
02:26 And y'all can find this in your juror's notebook as well.
02:26 BY MR. BURESH:
02:26 Q. What is the role of the Court's claim definitions in your analysis?
02:26 A. Right. So if you read a patent, you need to understand what it's saying. Now, most of the time, it's just -- you look at the words on the page and, you know, you go from there.
02:27 Many cases, and this one included, the Court will provide explicit definitions for certain terms. These are called claim constructions. And we've got a list of them -- you have this in your binder. I think we've even talked about this.
02:27 But peripheral component interconnect, PCI, bus transaction is defined. Console, there's a very particular definition. Then another one, encoded serial bit stream of PCI interconnect bus transaction.
02:27 So the rule is when I read the patent and try to understand infringement, if I come across one of these terms, I follow the Court's definition.
02:28 Q. Okay. Now, there's a number of terms in the claims that the Court doesn't provide a definition for,

fair?
A. That's correct.
Q. What do you do with those?
A. So that's when you start talking about the person of ordinary skill in the art. Now, I was one of these 20-some years ago, and I can imagine what that person would think.
We're not expecting you to be, you know, a person of ordinary skill in the art. So a lot of the terms are going to be, you know, what the heck is he talking about, or it could be any of these things?
So the rule is: What would a person of ordinary skill in the art at the time reading the patent understand that to mean?
MR. BURESH: Go to the next slide, please.
BY MR. BURESH:
Q. What are the accused representative products in this case?
A. So we've seen these before. One of them is this gaming laptop. The other one is this desktop PC.
Q. Okay. And what technology in these accused representative products is Dr. Sarhan asserting infringes?
A. So he's pointed to PCI Express, and he's

02:29 pointed to USB 3.

02:29 Q. At a high level, what did you conclude with respect to Dr. Sarhan's allegations?

02:29 A. They don't hold water. They don't -- they're not correct.

02:29 MR. BURESH: Okay. Go to the next slide. You're there already. Thank you.

02:29 BY MR. BURESH:

02:29 Q. This is Claim 19 from the '359 patent, correct?

02:29 A. Correct.

02:29 Q. And if the jury wants to find that claim, again, where would they flip to in their notebook?

02:29 A. Right. Okay. So yes. If you'd like to follow along, find the '359 patent. So that's the second one. That's J-2.

02:29 And then we're looking at Claim 19. So go to the very end. And it's actually on the very last page.

02:30 It starts on Column 39 and continues onto Column 40.

02:30 So technically speaking, you can find 19, a computer comprising, on Column 39, starting at Line 60.

02:30 Q. Okay. Now, in Claim 19 of the '359 patent, if we look about halfway down, we're going to see a connector that can couple to a console.

02:30 Do you see that?

A. Yes.
Q. How has the Court defined the term "console" in this case?
A. Yeah. So we saw it a moment ago.
MR. BURESH: If we can go to the next slide, please.
Thank you.
A. Yeah. Thank you.
And I've reproduced it here. So if the Court has said a console -- when we're reading these claims in the patent -- means a chassis or enclosure housing one or more coupling sites that connects components of a computer system.
And so one of the things you ought to ask yourselves is -- you know, does that make sense? And yeah. That fits nicely with what we've seen in the patents and, you know, the gray box and so forth that was shown earlier. So this just seems like a reasonable construction, a reasonable definition for console here.
BY MR. BURESH:
Q. And in fact, it is the definition, right?
A. It is absolutely the definition.
MR. BURESH: Now, if we could go to the next slide.

BY MR. BURESH:

Q. What is Dr. Sarhan contending meets that console requirement in the representative accused products?

A. So it seems to be peripherals. So he's identified things like a printer and external hard drive and a monitor as consoles.

Q. Do you agree with that?

A. No. That doesn't seem to match up.

Q. Why not?

A. Well, they're peripherals, not consoles. Peripherals are the things that connect to the console. How can something that you're supposed to connect -- are you connecting it to itself or -- I can't understand it. They're peripherals that he's identifying, not the console.

Q. If we go back to the --

MR. BURESH: Next slide, please.

BY MR. BURESH:

Q. If we go back to the claim language, what is your conclusion about whether Dr. Sarhan and ACQIS have established that the console limitations are satisfied in the asserted claims?

A. Right. So I look at what Dr. Sarhan is pointing to as a console and I say, that's not a

console. That doesn't meet the Court's definition.

So this part of the patent claim is not being practiced by -- in the -- in the ASUSTeK products.

MR. BURESH: Okay. If we could go to the next slide.

BY MR. BURESH:

Q. And here we've highlighted the first and second LVDS channels?

A. Correct.

Q. From Claim 19, correct?

A. Yes.

Q. Has the Court construed the term "LVDS channel" in this case?

A. It has not.

Q. In view of Dr. Chu's original patent disclosures that we've looked at, as a person of ordinary skill in the art in 1999 and 2000, what is your understanding of an LVDS channel?

A. Well, we saw it on the cover of that National Semiconductor book which Dr. Chu used. It's for bridging buses. It's this technology for taking a bunch of parallel stuff --

MR. HALES: Objection, Your Honor.

A. -- sending it over and putting it over.

MR. HALES: This is a new opinion.

MR. BURESH: This opinion was disclosed in at least Paragraphs 184 through 224 of Dr. Edwards' report.

THE COURT: And just to be clear, did he do just one report or is there --

MR. BURESH: He did two reports. This would be his noninfringement analysis.

THE COURT: Okay. Thank you, sir.

MR. HALES: Your Honor, if I can respond.

THE COURT: Sure.

MR. HALES: 184 begins discussion about the USB limitations. This is being rendered in response to the first LVDS channel, which in every instance is a PCI Express channel. Therefore, this is new opinion, at least as to that first LVDS limitation.

MR. BURESH: And, Your Honor, if we can go on past 284 to 285 and following, there is the same section on PCI Express which refers back to the analysis on USB not constituting LVDS channels.

THE COURT: Why don't we do this: Why don't you have him turn to that part of the -- his report and explain where the opinion you're now asking him for is in his report?

MR. HALES: And the objection is particularly with regard to being a bridge bus or a

02:34 bridge channel. That is new opinion.
02:34 MR. BURESH: Your Honor, may we approach?
02:34 THE COURT: Sure.
02:34 (Bench conference.)
02:35 MR. BURESH: I'm sorry. You want me to do what?
02:35 THE COURT: He's saying that what you're asking this expert --
02:35 MR. BURESH: I understand.
(Simultaneous conversation.)
02:35 MR. BURESH: You want me to have the expert --
02:35 THE COURT: Turn to the report and say, he's just challenged you to say this specific issue's not in the report. Would you explain to the jury where it is in your report?
02:35 MR. BURESH: Okay. Thank you.
02:35 MR. HALES: And I'm going to be very closely watching the issue of LVDS can't be used as a bridge.
02:35 THE COURT: Counsel, I just ruled.
02:35 MR. HALES: Got it.
02:35 (Bench conference concludes.)
02:35 BY MR. BURESH:
02:36 Q. Okay. Dr. Edwards, you have a copy of your

report in front of you.

A. I do.

Q. I'm going to ask you to turn to Paragraph 185. Okay.

In this paragraph, are you beginning to discuss the analysis that you conducted showing that USB 3 and later channels are not LVDS channels?

A. Yes.

Q. Okay. Are you concluding that such claims by -- as Dr. Sarhan has made are inconsistent with the disclosure of the asserted patents and are simply wrong at the bottom of Paragraph 185?

A. Yes.

Q. If we go to Paragraph 187, do you express the opinion that a USB channel not being an LVDS channel applies equally to any claim where Dr. Sarhan has pointed to USB as an LVDS channel?

A. Yes.

Q. Okay. If we go to Paragraph 191, Dr. Edwards.

A. I'm there.

Q. If you could review that paragraph and describe to the jury the opinion that you are articulating in that paragraph.

A. This is 191?

Q. Correct.

A. Okay. So this is discussion primarily just -- let's see.

So it's talking about how USB transactions would be carried over one of these LVDS channels. And then I write: But by suggesting that both USB data and other data such as PCI data types to be carried over the same channel, these disclosures are counter to Dr. Sarhan's interpretation --

THE COURT: Slow down just a little bit.

THE WITNESS: Sorry, Your Honor.

THE COURT: No. It's okay. I have a new court reporter.

THE WITNESS: I feel --

THE COURT: She's not.

THE WITNESS: I feel for her.

A. -- of the USB protocol claims.

BY MR. BURESH:

Q. In other words, what do you reach as a conclusion in the last sentence of that paragraph?

A. Yeah. Well, then I write: These disclosures do not support Dr. Sarhan's suggestion that the USB protocol claims are simply referring to transferring USB data over a USB channel, such as a USB 3.0 channel.

Q. And in the next paragraph, are you indicating that --

02:39 THE COURT: I'm good. I'm overruling the objection.

02:39 MR. BURESH: Okay. Thank you, Your Honor.

02:39 THE COURT: Unless you just want him to read the next --

02:39 MR. BURESH: But this is kind of fun. We could do this. I'm sure everybody enjoys it.

02:39 (Laughter.)

02:39 MR. BURESH: But I'd probably go back to my slides, if that's okay with Your Honor?

02:39 THE COURT: That's fine with me.

02:39 BY MR. BURESH:

02:39 Q. Okay. If we could back up a step now to get ourselves back on track.

02:39 In view of your analysis of the patents and going back to the original disclosures, what is your understanding of what an LVDS channel is based on?

02:39 A. So the patent is -- or the patents -- all of the patents and all the documents stapled to them are very consistent. LVDS channel is being used to bridge things from place to place.

02:40 The National data book that Dr. Chu cites and relied on is telling -- saying LVDS is used to bridge.

02:40 I'm relying on all of this.

02:40 Q. Okay. And again, is there any disclosure in any of the patent documents where LVDS channels are used for something other than bridging the two buses?
02:40 A. No. Dr. Chu is always saying use LVDS to bridge.
02:40 Q. Now, I want to look at Dr. Sarhan's analysis a little bit that we saw from yesterday.
02:40 MR. BURESH: If we could pull up PDX-03 at Slide 117, please.
02:40 BY MR. BURESH:
02:41 Q. Dr. Edwards, what does Dr. Sarhan contend is the first LVDS channel of Claim 19?
02:41 A. Let's see. I think he was pointing to this PCI Express channel coming off the processor on the top left.
02:41 Q. Okay. And what did Dr. Sarhan contend was the second LVDS channel of Claim 19?
02:41 A. He was pointing to the USB 3 ports off of the PCH. That's this green -- green box in the bottom.
02:41 Q. So one on the left and one on the right?
02:41 A. Correct.
02:41 Q. Is PCI Express a bus bridge like the XP Bus?
02:41 A. No. PCI Express is a bus.
02:41 Q. How about USB 3? Is it a bus bridge?
02:41 A. No. It's right there in the name. It's the

universal serial bus.

Q. So it's not the XP Bus?

A. It's not like the XP Bus. This isn't the USB-B.

MR. BURESH: Could we pull up Joint Exhibit 20, the PCI Express Version -- Revision 3?

BY MR. BURESH:

Q. Are you familiar with this document, Dr. Edwards?

A. Yes.

Q. Does the phrase "LVDS" appear anywhere in the specification?

A. No.

MR. BURESH: Mr. Palisoul, can you do a search on this document for the name "LVDS"?

BY MR. BURESH:

Q. Dr. Edwards, are you seeing any results from that search?

A. No. It says no matches were found.

Q. And why doesn't the term "LVDS" appear in the PCI Express specification?

A. Well, I can't read the minds of the people who wrote it, but they knew it wasn't LVDS. They didn't think of it that way.

Q. Okay.

MR. BURESH: Let's bring up Joint Exhibit 47, please.

BY MR. BURESH:

Q. This is the USB 3 specification. Correct?

A. Correct.

Q. Are you familiar with this specification?

A. I am.

Q. And does the name "LVDS" appear in this specification?

A. It does not.

MR. BURESH: Mr. Palisoul, could you run a search on this document?

BY MR. BURESH:

Q. Dr. Edwards, do you see any matches?

A. Again, it says no matches were found.

Q. Why doesn't the term "LVDS" appear in the USB 3 specification?

A. Well, I conjecture the people writing it didn't think it was LVDS.

Q. Would it even make sense to use a bus bridge like Dr. Chu's XP Bus in the context of the interconnections that were pointed to by Dr. Sarhan?

A. No. It would slow things down. One of them's connecting to a PCIe device, and that wants to speak to PCIe protocol. Why would you put a bridge in there if

02:44 you just wanted to go straight there? That would just slow things down.

02:44 And then, similarly, for USB, why build a bridge if there's no river to cross?

02:44 MR. BURESH: If we could go back to the slide, please. Back one.

02:45 Mr. Palisoul, can you get me to the one with the -- Dr. Sarhan's. That's the one I'm looking for, Dr. Sarhan's slide.

02:45 BY MR. BURESH:

02:45 Q. Okay. And, Dr. Edwards, just so we can talk about this for a minute more, can you circle the two that Dr. Sarhan is accusing again?

02:45 A. Sure.

02:45 Q. And explain one more time, looking at this picture now, would it make sense to have a bridge bus for either of these buses, PCI Express or USB?

02:45 A. Yeah. Not at all. That would be something like, you know, let's add something that slows things down in the middle of these along the way.

02:45 You know, again, if you want to get somewhere and you can get there without crossing a bridge, why spend the time?

02:46 Q. Okay. In Dr. Chu's disclosures, is there ever any more than one XP Bus?

A. No. Every single time, it's one attached computer module, one XP Bus.

Q. Did any -- in any of his patent disclosures, did you see anything looking like two separate XP Buses going off in different directions?

A. No.

Q. In his disclosures, did you see anything that looked like an XP Bus that was spread over different places?

A. No. It was always one ACM, one XP Bus.

MR. BURESH: If we could go back to our slides now.

Next slide, please.

BY MR. BURESH:

Q. Have you reached a conclusion with respect to whether the first and second LVDS channel limitations of Claim 19 are satisfied in the accused products?

A. Right. Not -- I don't agree with Dr. Sarhan's conclusions. So these two parts are not being practiced.

Q. If we could move to the adapted to transmit limitation at the bottom.

Do you see that, Dr. Edwards?

A. Yes.

Q. Can you explain to the jury what it means to

02:47 adapt a channel to transmit USB data over Dr. Chu's LVDS channels?
02:47 A. Right. Well, to adapt something means you got to do something to change it to make it actually work. So in Dr. Chu's invention, that adaptation is something like you take the USB data and you change it and you encode it so that it works on the XP Bus, and then you -- so that you can do something at the other end.
02:48 Q. Okay.
02:48 A. If you don't have to change it, I don't see how it gets adapted.
02:48 Q. Do you have to adapt a USB 3 link in order to transmit USB 3 data?
02:48 A. No. That's exactly what a USB 3 link does.
02:48 Q. Do Dr. Chu's patent disclosures ever call his LVDS channels a USB channel?
02:48 A. No.
02:48 Q. Do they ever call a USB channel an LVDS channel?
02:48 A. No.
02:48 Q. They treat them as distinct, don't they?
02:48 A. Yes. They -- he understands the distinction.
02:48 Q. Okay. With respect to the final limitation of Claim 19 that we're looking at on Slide 47, what is your conclusion with respect to whether that limitation

is satisfied in the accused products?
A. Yes. Again, I find that it's not satisfied.
Q. We have four elements of this claim that are not satisfied.
What does that mean with respect to your overall opinion regarding Claim 19 of the '359 patent?
A. Well, remember, it only takes one red X. We have four red Xs here. This claim is not satisfied. Not infringed.
Q. All right.
MR. BURESH: If we can go to the next slide.
BY MR. BURESH:
Q. What claim do we have on Slide 50, Dr. Edwards?
A. So this is the '768 patent, Claim 13.
Q. And how does Claim 13 of the '768 patent compare to Claim 19 of the '354 -- '359 that we just looked at?
A. So in particular, I've written it out here in bold, we have this LVDS channel constraint as well being identified.
Q. And is your understanding of an LVDS channel in this claim any different than the LVDS channels that we just looked at in the previous claim?

A. No. All the LVDS channels in the claims and the patent and so forth are the same.

Q. What does Dr. Sarhan contend is the LVDS channel of Claim 13 of the '768 patent?

A. He's pointing again to the PCI Express link.

Q. And is -- is an PCI Express link an LVDS channel in the context of Claim 13?

A. No.

Q. In addition, this middle limitation has the requirement of: Conveying address and data bits of a peripheral component interconnect PCI bus transaction.

Do you see that?

A. That's correct.

Q. At a high level, what does that limitation require?

A. Well, so there's a bunch of words here. I apologize to the jury, but the -- it's talking about something that's part of a peripheral component interconnect bus transaction.

So what the heck is a peripheral component interconnect?

Well, the first thing, this is back in 1998/1999. This is PCI local bus.

Okay. Well, what is a bus transaction, and what are the address and data bits of that? Well, the

02:51 Court's provided us guidance on how to interpret all of this.

02:51 MR. BURESH: If we can go to the next slide.

02:51 BY MR. BURESH:

02:51 Q. What is the Court's definition of a PCI bus transaction?

02:51 A. So appropriately, it talks about PCI local -- it says: A transaction in accordance with the industry standard PCI local bus specification for communication with an interconnected peripheral component.

02:52 And it further explains that: "In accordance with" includes backwards compatibility.

02:52 So it's telling us, let's go look at the spec.

02:52 Q. Okay. Now, the focus or the subject of this definition is the transaction, correct?

02:52 A. That's correct.

02:52 Q. And the Court's telling us to look to the PCI local bus specification?

02:52 A. That's correct.

02:52 MR. BURESH: If we could pull up Joint Exhibit 65.

02:52 BY MR. BURESH:

02:52 Q. On the right-hand side of your screen, what is Joint Exhibit 65?

A. So this is this PCI local bus specification document. I think we saw this version earlier today and, if not, earlier in the -- earlier in the trial.

This is the document that says this is what PCI local bus devices need to do. If you follow this document, you're a PCI local bus device; if you don't, you're something else.

Q. Does this PCI local bus specification describe what it is to be a PCI bus transaction?

A. Absolutely. Lays it out in gory detail.

MR. BURESH: If we could go to the next slide, please.

BY MR. BURESH:

Q. I don't want to get to the level of gory detail, please.

And we've looked at this with Mr. Bhatt before, correct?

A. Correct.

Q. Briefly, what are we seeing here out of the PCI local bus specification?

A. So on the right, this big block diagram. If you remember, it's talking about the pins that need to be part of the PCI local bus and what they mean.

Q. Now, in order to have a transaction that is in accordance with or compliant with PCI local bus

specification, can you remind us how many pins and wires are required?

A. Yeah. It spells it out right at the beginning. It says you got to have 47 pins. That's this collection on the left.

Q. And how many of those pins in the PCI local bus specification are address and data pins?

A. You can see those marked here. The number Dr. Sarhan used, and I'll use that too, is 36. So 32 of the actual address and data, and then another four of, what is it, command byte enabled.

MR. BURESH: If we can go to the next slide.

BY MR. BURESH:

Q. What does it mean to be a PCI local bus transaction?

A. Okay. So I'll try to -- I'll try to skip the gore, but you can see on the left side here it's defining the write transaction. So there's a variety of transactions, and these transactions are just like, you know, if you go to a bank and do something like that. There's a series of rules for how information is exchanged. Well, that's what's being shown here on the left.

Now, this is an engineering diagram. This is

something I'd actually show to my students. It's telling us -- time goes from left to right on this diagram. And it's telling us what groups of pins or individual pins, what voltages need to be on those at each point in time. So this is a pretty technical thing. I'm sorry. That may be too gory.

Q. You're doing the best you can.

MR. BURESH: If we could advance a slide.

BY MR. BURESH:

Q. Which portion of the transaction that we're looking at are address and data?

A. Right. So they're marked over here. On the right, we've got the figure from the -- earlier in the spec. And we've got the A/D lines. So those are exactly this bunch.

And then we've got the command and byte-enabled lines. So that's the next row in the write transaction diagram.

Q. So in order to have address and data bits of a PCI bus transaction, what do you need?

A. The stuff on the left.

Q. Anything like that in PCI Express?

A. No.

Q. Anything even close?

A. Not even close.

02:56 Q. We've heard that the -- from multiple witnesses now that the PCI local bus or anything associated with it doesn't appear in the accused products.

02:56 Have you heard that?

02:56 A. Yes.

02:56 Q. How would it be possible for the accused representative products to convey any part of a PCI local bus transaction if there isn't any PCI local bus?

02:56 A. I've never been able to figure that out. That's like if you bring to me the peel of an orange and say, oh. This is an orange peel.

02:56 And I'd say, well, where's the orange? Did you ever have an orange?

02:56 You say, oh. I never did.

02:57 Doesn't make any sense. If you claim that you have part of something, then the bigger thing must have been around at some point.

02:57 Q. Can you have a PCI local bus transaction without a PCI local bus?

02:57 A. No. You cannot.

02:57 Q. When the accused products use PCI Express, are they ever conveying address and data bits of a transaction that's in accordance with the PCI local bus specification?

A. No. From this diagram, these transactions are -- what's drawn on the left, very, very specific. The accused products never have this. Never do this anywhere in them.

Q. Okay.

A. You don't have the address and data bits of a PCI local bus transaction.

MR. BURESH: Mr. Palisoul, could you pull up the Court's claim constructions again? And focus in on PCI bus transaction.

BY MR. BURESH:

Q. The Court's told us that "in accordance with" includes backwards compatibility.

Do you see that?

A. Yes.

Q. What does it mean to be backwards compatible?

A. So it means the new stuff works with the old and vice versa.

Q. Is there a good example that the jury's already heard about of how backwards compatibility works?

A. Yeah. Yeah. They saw it this morning with the USB.

Q. Can you tell us about that?

A. Certainly. Back in 1998, shortly after I was

married, my wife -- we bought a Macintosh computer, and it had a USB keyboard on it. This was one of the first USB keyboards I ever owned.

Now, that computer is long gone. The monitor's long gone. Wife is still there. The keyboard still works fine with my modern computers.

I also have a bunch of old computers back from the '90s, and I routinely plug in brand-new USB keyboards to them. So it works both ways. Computer or the keyboard could be old or new. And all of those combinations work. That's backwards compatibility to me.

Q. And today, I believe Ms. Marriott, she had a USB 3 port on the accused laptop, correct?

A. Correct.

Q. And then she had a mouse with a USB 2 core?

A. Correct.

Q. That'd be the old stuff?

A. That's correct. The mouse -- the mice haven't had to change, right? You know, our hands don't move any faster. The mice are unchanged.

The USB ports have gotten faster and faster for hard drives and things like that. But it's exactly that. It's you can take a mouse of any age, provided it has USB, and it will work with any generation of USB

03:00 that's there.
03:00 Q. And looking on the screen in front of you,
03:00 briefly explain why that works.
03:00 A. Right. So over here on the left, you got a USB 2 connector, and it has these four pins in it. Well, it's actually really simple. If this is your mouse, USB 2 mouse, and you plug it into the USB 3 port on the right, like what's on the accused product, well, we have right here those same four pins doing exactly the same thing they've been doing since the mid 1990s.
03:00 And so backwards compatibility is straightforward. You make the things connect, and then you make it behave like the old stuff too. And the trick is, you know, how do you add the new stuff?
03:01 Well, you add them separately in a way that the old stuff can ignore it. These are these five new pins that you heard Mr. Bhatt talk about.
03:01 And if you look, those aren't there on the USB 2 connector. They haven't been invented yet. Plug this thing in, the USB 2 connector doesn't notice those new pins. Doesn't try to connect to them.
03:01 Q. So to summarize, if I plug the USB 2 mouse into the USB 3 port, my old stuff will still work with my new stuff?
03:01 A. Exactly.

03:01 Q. And that makes it -- that means it's backwards compatible?

03:01 A. That's backwards compatible. Anything less, don't trust it.

03:01 MR. BURESH: May I approach, Your Honor?

03:01 THE COURT: Yes, sir.

03:01 BY MR. BURESH:

03:02 Q. What have I just handed you, Dr. Edwards?

03:02 A. Yeah. So this is what Mr. Bhatt saw this morning. So we have a PCI local bus card. You can just tell there's, you know, a long gold connector on it and a PCI local bus slot. And not surprisingly, they go together very nicely. They're designed to do exactly that.

03:02 Similarly, I've got a PCI Express slot, much smaller, and a PCI Express card. And not surprisingly, those two go together really nicely.

03:02 However, if you go mixing and matching, not surprisingly, the big one doesn't fit in the small one. Furthermore, the newer small one, while you might be able to cram it into the old one, if you ever turned it on, you'd get smoke.

03:03 In practice, what's going on is this is near the edge of the computer. And if you try to plug it in, there's actually this extra little bump that seems

not to do anything, and what that's doing is it's making sure that you can't actually shove this thing into a PCI local bus thing.

Now, this is not an accident. When they designed this, they knew that they didn't want you to mix and match because it would cause smoke. And so the physical design of it, just the fact that they're different shapes, they did that intentionally to make sure that you didn't connect up some random electrical thing that would cause your computer to break into smoke or sparks or anything like that.

So this is -- this is not an accident. Right? There are a couple of times where people have built things differently. But not this one. This one was the old one doesn't work with the new one.

Q. Okay. So if I have a PCI local bus on an old computer --

A. Such as this.

Q. That one. And PCI Express is out. I go to the store and buy a PCI Express card --

A. Yep.

Q. -- is it going to work with my old stuff?

A. You're out of luck. It will not work. You'll come home. You'll try to plug it in. You won't succeed. You'll take it back to the store and say, no,

no, no. I need a PCI local bus card. It doesn't work.
Q. Is PCI Express backwards compatible with PCI local bus specification?
A. No.
Q. What would you need to see for an interconnect that conveyed address and data bits of a PCI local bus transaction to be backwards compatible with the PCI local bus specification?
A. Well, to be compatible with the PCI local bus specification like we saw, I'd want to see a connector like this. Right?
The specification that we were looking at specifically says, hey. You've got this connector. There's these 47 pins that have very particular timing and meaning and all the rest of it.
And if you don't have that, the card's going to say, what the heck is going on? I don't know. I'm expecting that protocol. I'm expecting that connector.
Now, we see that with USB 2 going to 3. They made it backwards compatible. They did it. They were very careful. They kept the old one around, the USB -- the four USB 2 pins. And that's present right there in the USB 3 port. That's how you do backwards compatibility.
That's not how PCI Express did -- attempted to

03:06 do backwards compatibility. They didn't do it at all.
03:06 MR. BURESH: If we can go to the next
03:06 slide, please.
03:06 BY MR. BURESH:
03:06 Q. Do the PCI Express interconnects as
03:06 implemented in the accused products convey any part of
03:06 the transaction that's backwards compatible with the
03:06 PCI local bus specification?
03:06 A. No.
03:06 Q. Now, from Dr. Sarhan we heard a fair amount
03:06 about software models.
03:06 Do you recall that?
03:06 A. Yeah. I remember that.
03:06 Q. And configuration space?
03:06 A. Yes.
03:06 Q. Do you recall that?
03:06 Does this construction from the Court say
03:06 anything about software backwards compatibility?
03:06 A. No. And one way to tell, look at the
03:06 construction. Look at the words. It is a transaction.
03:07 If you look in the PCI spec, the PCI local bus spec
03:07 like I have, you will find that transaction is defined
03:07 in -- across a few chapters.
03:07 And the software stuff, the configuration
03:07 stuff that they were talking about, that's something

else. It doesn't have anything to do with the transaction.

Q. Is a transaction generated -- is a PCI local bus transaction generated by software?

A. No.

Q. Is it generated by the CPU?

A. No.

Q. In a PCI local bus specification, are there sections discussing what it means to be a transaction like we've looked at?

A. Yeah. Yeah. Exactly those timing -- that timing diagram that I showed you.

Q. And are there separate portions of the specification that would discuss, for example, configuration space?

A. Right. And it never even mentions transactions in that chapter.

Q. Because those are totally different concepts, aren't they?

A. It's a whole 'nother level of worrying about things.

Q. So what is your opinion as to whether PCI Express transactions are backwards compatible with the PCI local bus specification?

A. They aren't. They're not backwards

03:08 compatible.

03:08 Q. Okay. If we look at Claim 13 again, have you reached a conclusion with respect to whether the second limitation that begins "a first low voltage differential signal" and includes "a peripheral component interconnect bus transaction or address and data bits of that transaction?

03:08 What is your conclusion with respect to whether that limitation is satisfied in the accused products?

03:08 A. In the accused products, that limitation is not infringed, both for the LVDS stuff we mentioned earlier and the PCI address and data bits stuff that we were just talking about.

03:09 MR. BURESH: Okay. Could we pull up the '768 patent? And Figure 8B, please.

03:09 BY MR. BURESH:

03:09 Q. We've looked at two claims now, correct, Dr. Edwards?

03:09 A. Yes.

03:09 Q. Do the claims that we've just looked at correspond to this architecture in Figure 8B?

03:09 A. Yeah. It's talking about this big integrated CPU with essentially everything that -- including the interface controller that generates the XP Bus.

03:09 Q. Okay.

03:09 MR. BURESH: If we go to the next claim in our slides.

03:09 BY MR. BURESH:

03:09 Q. Claim 10 of the '768 patent. Do you see that on the right?

03:09 A. Yes.

03:09 Q. How does that claim compare to the claims that we've looked at so far?

03:10 A. Very similar.

03:10 Q. Okay. We also see a LVDS channel limitation; is that correct?

03:10 A. That's correct.

03:10 Q. And what is your conclusion about whether that LVDS channel limitation is satisfied in the ASUS accused products by the use of PCI Express?

03:10 A. This part of the '768 Patent, Claim 10, doesn't infringe for the same reasons we've just been discussing for the Claim 13 of that patent.

03:10 Q. And what are those reasons?

03:10 A. There is not the LVDS channel of the patent, and we don't have the address and data bits of a PCI bus transaction.

03:10 Q. Okay. I want to look at the first limitation briefly.

We have: A peripheral bridge directly coupled to the central processing unit without any intervening peripheral component interconnect bus.

Do you see that?

A. Yes. I see that.

MR. BURESH: If we could pull up Figure 8A of the '768 patent.

BY MR. BURESH:

Q. How does the architecture that we see in Figure 8A relate to the no intervening PCI local bus limitation that we just saw?

A. Right. Well, what that claim of the patent is talking about was this connection here marked peripheral bus, and it's just observing that that is not a PCI bus. That's something else. It's marked peripheral bus. That claim is just saying that can't be a PCI bus.

Q. Do you recall Dr. Sarhan pointing to that claim limitation and these figures that we're looking at and saying, there's no PCI local bus anywhere in the system?

A. Yes. And that puzzled me.

Q. Do you agree with him?

A. I do not agree with that.

Q. Why not?

A. Well, remember our discussion about the boxes and the Amazon stuff? Well, what's going on here?

These two things are just integrated, and it's listing all of these things. So this Box 820, integrated south bridge and host interface controller, well, we saw a south bridge before. It's the thing that's pumping out all those buses, including PCI. And host interface controller, that's the thing that's taking PCI and those other buses and transforming it into the XP Bus.

Q. Where is, then, the PCI local bus in this Figure 8A architecture?

A. Has to be hiding here -- sorry. PCI local bus would be hiding in here. We've got the HIC in the south bridge, or the two boxes inside that box somehow.

Q. Now, do these various levels of integration that have been depicted in the patents, do they change your opinion with respect to the LVDS channels of the XP Bus in any way?

A. No. The LVDS channels are always the same and are being used the same way.

Q. Okay. Coming back to Claim 10 of the '768 patent, what is your conclusion as to whether the accused products infringe this claim?

A. They do not.

MR. BURESH: If we could pull up PDX-03 at Slide 140, please.

BY MR. BURESH:

Q. This is a slide from Dr. Sarhan's presentation, correct?

A. Yes.

Q. Okay. And he's describing a doctrine of equivalents opinion that he provided to the jury, correct?

A. Correct.

Q. And I think he talked about the triple identity test.

Do you recall that?

A. Yes.

Q. Function-way-result?

Looking at the way, No. 2, do you see the second bullet point here, it says: Transactions are conducted in their own specified ways and these ways are not substantially different?

A. Yes. I see that.

Q. That was Dr. Sarhan's conclusion, correct?

A. That's correct.

Q. What do you think about that?

A. I don't know how he gets not substantially different for these two radically different

technologies.

Q. In all the discussions we just went through of the PCI local bus versus PCI Express, how would you characterize the differences between those two?

A. Well, they're numerous. But, you know, this is 1992 technology, the PCI local bus. This is 2004 technology. So it's, what, 12 years at least.

And what did Mr. Bhatt say? There was some enormous speed difference, you know, 100x or something like that. And it's just been getting more and more.

So, you know, I don't know about you, but walking 100 feet versus flying an aircraft for 100 feet, that's pretty different. I mean, yeah. You're conveying yourself from one place to another, but you're going so much faster. I don't see how he gets not substantially different from those two things.

There are a variety of other technical reasons, but the speed is really the obvious one.

Q. Do you recall the packets, the envelopes from PCI Express?

A. Absolutely.

Q. Anything like that in PCI local bus?

A. No, no. You saw the pictures drawing the tiny diagrams for the PCI local bus. Packets are nowhere to be seen.

03:15 Q. What about the 47 pins in PCI local bus? Anything like that in PCI Express?

03:16 A. No. PCI Express -- well, yeah. There are far fewer than 47 pins here. There's no way you could have that as part of a PCI Express bus.

03:16 Q. What about the result? Do you think the result of PCI Express is substantially the same as the result of PCI local bus?

03:16 A. They changed a lot. They made it so you could move enormous amounts of data. They changed the protocol. I also don't see how he gets substantially the same result out of that.

03:16 Q. What is your opinion with respect to whether a PCI local bus transaction is equivalent to a PCI Express transaction?

03:16 A. I don't find them equivalent.

03:16 MR. BURESH: Your Honor, I'm going to transition now to invalidity if it would be an appropriate time for a break.

03:17 THE COURT: I think so.

03:17 Ladies and gentlemen of the jury, we are going to take our afternoon recess for 10 or 15 minutes.

03:17 THE BAILIFF: All rise.

03:17 (Jury exited the courtroom.)

03:17 THE COURT: You may step down.
03:17 Is there anything we need to take up?
03:17 MR. HALES: Just a further statement on the objection --

(Clarification by Reporter.)

03:17 MR. HALES: I've searched the report, Your Honor, Dr. Edwards' opinion that an LVDS should be interpreted to require a bridging element or bridging aspect to it appears nowhere in the report.

03:17 THE COURT: A response?

03:17 MR. BURESH: We can go through the report in further detail if you want. The opinions described in there are that an LVDS channel is an XP Bus, that the XP Bus operates as a bridge, and that the buses in our systems are not like the XP Bus, the LVDS channels, or the bridge in any way.

03:18 That's what the opinions are. I have pages and pages on it.

03:18 THE COURT: Yes, sir.

03:18 MR. HALES: The opinion delivered is that LVDS' plain and ordinary meaning includes a bridging aspect to it.

03:18 I've reviewed every instance of the word "bridge" in the report, and that simply doesn't appear. He hasn't disclosed this as his plain and ordinary

03:18 meaning of LVDS.

03:18 MR. BURESH: He literally read into the record his opinion that the LVDS channels are talking about the XP Bus, which he has entirely separate sections describing the XP Bus in detail.

03:18 THE COURT: I'm good. I'm going to overrule the objection.

03:18 We'll be back in ten minutes.

03:18 (Recess taken.)

03:31 THE BAILIFF: All rise.

03:31 THE COURT: Please remain standing for the jury.

03:31 (Jury entered the courtroom.)

03:32 THE COURT: Thank you. You may be seated.

03:32 Counsel?

03:32 BY MR. BURESH:

03:32 Q. All right. Dr. Edwards, continuing on now with your Slide 68, there are two requirements listed on this slide, correct?

03:32 A. Correct.

03:32 Q. What are they?

03:32 A. So these were two more questions I was asked to evaluate, and these are, you know, components of the law. One of them's this written description

requirement, basically: Did he have the invention he claimed back in 1999?

Now, there's an enablement requirement I believe we'll speak about later.

Q. Okay. Focusing in on the written description requirement, what were you looking for in this case? How did you conduct your analysis?

A. So I was specifically looking for what the original documents, 1999/2000, disclosed. And did the inventor have the full scope about -- of what is currently being claimed here?

So, in particular, I was looking at what Dr. Sarhan thinks the scope of the invention was.

MR. BURESH: If we can go to the next slide.

BY MR. BURESH:

Q. Can you remind the jury of which documents are necessary to consider to determine the original scope of the invention?

A. Yes. So these are exactly the two that we talked about earlier. The provisional and this May 2000 patent that is the parent of the two patents in the case.

Q. Okay. Why is the 1998 provisional application important to this analysis?

A. We talked about this earlier with the stapler. It's incorporated by reference in the parent patent.

MR. BURESH: If we could go to the next slide.

BY MR. BURESH:

Q. Based on your analysis, what invention was Dr. Chu in possession of as of the effective filing date in 1999/2000, based on the disclosure from the original patent filings?

A. So a bridge bus, we can talk about this the whole time. He has something, takes a bunch of peripheral buses, runs it through this host interface controller, sends it over to the XP Bus, over the peripheral console.

And he suggests a number of different ways you can integrate these boxes that are shown on the left, but that's basically it.

Q. Okay. Are there any figures in these patents or written disclosure describing the invention as anything other than a peripheral bridge bus like the XP Bus?

A. No.

Q. In contrast to an XP Bus with LVDS channels carrying multiple types of data in a common form, the bridging concept, what is the scope of the claims that

Dr. Sarhan is now alleging?
A. So in this cartoon, he's alleging that this PCI Express interconnect somehow uses one of these LVDS channels, one of these bridges, and it doesn't.
Similarly, he's saying that, oh, in the USB 3 interfaces, well, those are -- those also involve these LVDS channels.
Q. Were you analyzing whether the whole PCI Express specification with all the bells and whistles, are you saying that it needed to be described in the original disclosures?
A. No. Not at all. I was looking for these LVDS channels.
Q. Is there any part of Dr. Chu's disclosures that suggest that his invention is directed toward the buses rather than the XP Bus or the bus bridge?
A. No. His invention was this bus bridge that would take PCI and some of the other buses, convey it using this differential signaling technology, and then reconstitute it the other side. Exactly the bridge bus that we've been talking about.
Q. In the original patent disclosures, is there -- is there any hint that Dr. Chu was in possession of an invention that would go towards new buses, new interconnects, as opposed to a bridge bus

like the XP Bus?

A. No. We saw that earlier. It was saying the invention is peripheral bridge bus. And there's other words there, but it's pretty clear that was -- that was the thing. It just talks about a bridge.

Q. Now, we've seen in the documents and heard some testimony about the XP Bus carrying multiple types of data in a common way, correct?

A. Correct.

Q. So USB, PCI, 1391, they'd all be carried over the XP Bus in a similar fashion?

A. Correct.

Q. Now, these PCI Express and USB 3 interconnects that Dr. Sarhan's pointing to, are they like that?

A. No. The -- as the name would suggest, PCI 3 -- excuse me. PCI Express interconnect, something like this, carries PCI Express data. That's the sole purpose.

Similarly, you know, it's tautological. But if you have a USB link, it is for carrying USB data. It doesn't -- it doesn't do this, oh, you can carry all these different protocols. No. It -- USB cable is for USB data.

Q. Would you --

A. PCI Express is for PCI Express.

03:38 Q. Sorry to interrupt.
03:38 Would you transmit a USB 3 packet over a PCI Express interconnect?
03:38 A. No. I don't see how you'd do that. And certainly if you did, the interconnect would come back and say, what is this? What did you just send to me? I have no idea.
03:38 Q. Would you ever transmit a PCI Express packet on a USB 3 interconnect?
03:38 A. No. For the same reason. You know, it'd be like sending somebody a letter in a foreign language that you can't read it. It's like what is this? Is this even a letter?
03:39 Q. How does the way that Dr. Sarhan is applying these claims, which -- let me just ask you this: He used -- you called it a cartoon, correct, with the red pen?
03:39 A. Yeah. Yeah.
03:39 Q. And you're indicating what Dr. Sarhan is pointing to with that red pen, correct?
03:39 A. That's the idea here. Yeah.
03:39 Q. How does the manner in which Dr. Sarhan is applying these claims to extend the scope to PCI Express and USB 3 interfaces, how does that compare to Dr. Chu's original patent disclosures?

A. Dr. Chu's original patent disclosures talks about bus bridge implemented in a particular way.

Dr. Sarhan is saying, oh, wait. He didn't invent a bus bridge. He invented a new bus or something that could turn into a new bus. It isn't. It's a bus bridge.

Q. Now, if we consider this full scope as being alleged by Dr. Sarhan, do you believe that in 1999 or 2000, Dr. Chu was in possession of that invention that Dr. Sarhan is now pointing to?

A. I do not believe Dr. Chu was in possession of an invention of that scope.

Q. What is the impact of your opinion?

A. The read -- my conclusion, then, is this patent claim is invalid.

Q. Now, in this Claim 19, there's the LVDS channels that Dr. Sarhan is pointing to as PCI Express and USB 3.

We've seen that in the other claims, correct?

A. That's correct.

Q. And in each of those claims where Dr. Sarhan is contending that the LVDS channel is either PCI Express or USB 3, would you have the same opinion?

A. Yes. So again, Dr. Sarhan is claiming that in PCI Express or in USB 3 resides one of these LVDS

channels. And it doesn't.

Q. So if we look at Claim 13 of the '768 patent, what is your opinion with respect to that claim?

A. It's invalid for the same reasons.

MR. HALES: Your Honor, can we sidebar?

THE COURT: Sure.

(Bench conference.)

MR. HALES: This opinion is that Dr. Chu was not in possession of an LVDS channel in any form except for a bus bridge. He hadn't figured out how to use it in any other way. The term "bus bridge" does not appear in the invalidity report once, which is the first of the two reports.

One would imagine that this LVDS understanding as a bus bridge would have been disclosed in the initial report. Bus bridge doesn't appear once.

MR. BURESH: I don't know that to be the case. But what we're talking about here is the XP Bus of Dr. Chu's invention. The --

THE COURT: If you can't tell me where it's at in the report, then I'm going to strike it.

MR. BURESH: Oh, I have the opinions.

THE COURT: Just tell me.

MR. BURESH: I didn't know that's what he was going to sidebar on. If you want the paragraphs,

03:42 I'll go get them.

03:42 MR. HALES: I'll wait, if the Judge is all right with it.

03:43 MR. BURESH: Your Honor --

03:43 (Bench conference concludes.)

03:43 THE COURT: Ladies and gentlemen, we're going to take a short break. We'll be back in just...

03:43 Please remember my instructions.

03:43 THE BAILIFF: All rise.

03:43 (Jury exited the courtroom.)

03:43 THE COURT: You may be seated.

03:43 I don't know what's going on between you guys. I don't know what the deal is about why y'all can't get along. But, you know, my sons when they were in high school wouldn't act the way you guys are acting up here.

03:44 Now, the only tool I have to deal with this is in front of the jury. I don't generally do that, but if you guys can't even act like adults up here at the bench, I will make it very clear to the jury how I feel about it.

03:44 Is that going to be -- is that clear going forward?

03:44 MR. BURESH: It is, Your Honor.

03:44 MR. HALES: Yes, Your Honor.

03:44 THE COURT: Now, if you want to tell me where it is in the report --

03:44 You may be seated.

03:44 MR. BURESH: Yes, Your Honor. We described in detail the operation of the XP Bus operating in a manner to bridge the peripheral buses at Paragraphs 62 through 65.

03:45 And then at Paragraphs 209 through 227, we apply that understanding of the XP Bus in the context of written description as applied to Dr. Sarhan's scope of PCI Express and USB 3.

03:45 THE COURT: I'm going to overrule the objection.

03:45 Bob, would you bring the jury back in?

03:45 THE BAILIFF: Yes, sir.

03:48 (Jury entered the courtroom.)

03:48 THE COURT: Thank you. You may be seated.

03:48 Counsel, you may continue.

03:48 MR. BURESH: Thank you, Your Honor.

03:48 BY MR. BURESH:

03:48 Q. Okay. Dr. Edwards, I believe I skipped to Claim 13. If we could back up to Claim 10, does it also have the LVDS limitations in it that we've been looking at?

03:49 A. It does.
03:49 Q. And is Dr. Sarhan treating those as PCI Express in the -- in Claim 10?
03:49 A. Yeah. He's treating them in a very similar way.
03:49 Q. What is your opinion with respect to that claim and whether it satisfies the written description requirement?
03:49 A. So as I've said before, the LVDS channels aren't present in PCI Express. This claim is invalid.
03:49 MR. BURESH: Okay. If we could go to the next slide, please.
03:49 BY MR. BURESH:
03:49 Q. Looking at each of the asserted claims, that is the '359 patent, Claim 19; the '768 patent, Claim 10 and Claim 13, what is your opinion with respect to the validity of those claims based on the written description requirement?
03:49 A. So as I just discussed, the inventor did not have the invention with the scope that's currently being claimed for his -- you know, the posts weren't there in that fence. And my conclusion is that those three claims are invalid.
03:50 MR. BURESH: If we can go to the next slide, please.

03:50 BY MR. BURESH:

03:50 Q. Next up is the enablement requirement.

03:50 Dr. Edwards, could you describe for the jury what analysis you conducted with respect to this requirement?

03:50 A. Yeah. So this is asking the question: Did the inventor give out enough information for a person of ordinary skill in the art back in 1989 (sic)/2000, to build -- to practice the invention, to go and build something according to his plans.

03:50 And the problem always is, oh, they kept too much for themselves, they didn't explain something. So the question is, oh, is there enough there to actually build the invention as claimed?

03:50 Q. Okay. What does it mean to make and use the full scope of the claimed invention? What does the "make and use" mean?

03:51 A. So be able to put it together. Right? So what we're looking at is a bunch of claims about computer systems and parts and how to build those things and how to put them together.

03:51 The question is: Could a person of ordinary skill in the art follow those instructions and put together one of these systems?

03:51 MR. BURESH: If we can go to the next

slide, please.
BY MR. BURESH:
Q. What did Dr. Chu's 1999/2000 patent disclosures attempt to allow a person of ordinary skill in the art to make and use?
A. So what we've been talking about the whole time. This is a modular computer system, the XP Bus bridge that could bridge PCI, 1394, things like that. And it's described here. We've seen this many times.
Q. Do you recall Dr. Chu testifying that he couldn't get the XP Bus of his invention to work?
A. That's correct.
Q. Did the '99/2000 patent descriptions allow a person of ordinary skill in the art to actually make and use the XP Bus?
A. No. I do not believe so.
MR. BURESH: If we could go to the next slide.
BY MR. BURESH:
Q. In contrast to Dr. Chu's patent disclosures of the XP Bus, how is ACQIS and Dr. Sarhan applying the claims here in court this week?
A. Well, they're claiming that PCI Express and USB 3, that somehow taking his invention and starting from there, you could get to PCI Express or USB 3,

something like that.

And so the question is: Could a person of ordinary skill in the art at the time build something like that starting from that, starting from that point?

Q. Okay. What evidence is there in the patent disclosures to even hint or suggest that Dr. Chu was instructing a person of ordinary skill in the art how to make and use anything other than an XP Bus or bus bridge?

A. Yeah. That's the thing. He isn't. He was always teaching us how to build a bus bridge. And, well, okay. That -- he wasn't able to. But in particular, he never said anything about, oh, let's not use this as a bus bridge. Let's use this as a bus.

No. It was always a bus. Excuse me. It was always a bus bridge that he was teaching us.

So doing something like creating a whole new bus standard, like PCI Express or USB 3, that just wasn't ever part of the description. It was never described.

Q. Did Dr. Chu's original patent descriptions in 1999 and 2000 allow a person of ordinary skill in the art to make and use a brand-new bus like PCI Express or USB?

A. No.

Q. USB 3. Let me be more specific.
A. USB 3, no.
Q. If a person of ordinary skill wanted to make and use a new interconnect, a bus, like PCI Express or USB 3, what guidance did Dr. Chu's 1999/2000 patent disclosures provide to that person of ordinary skill?
A. Nothing. He taught them to build a bus bridge.
Q. In light of that, with no assistance from the patent disclosures, what would you expect a person of ordinary skill in the art would need to do to get to a new bus?
A. Right. Well, an enormous amount of work. And you heard this morning from Mr. Bhatt how much effort goes into developing one of these industry-standard buses. So certainly a lot of engineering work.
Q. What type of experimentation would you expect to be involved?
A. Well, a lot of engineers working for a long time, thinking of -- you know, trying this, trying that, coming up with different details, doing this experiment, doing that experiment.
Q. Now, the law gives us a set of factors to consider in the context of undue experimentation; is that correct?

03:55 A. That's correct.
03:55 Q. Okay. Are those factors listed on Slide 80, which is in front of you?
03:55 A. Yeah. This -- my understanding is that this is a legal test. And specifically for what does undue experimentation take, it gives us this list to consider.
03:55 Q. Okay. I'm going to walk through these in turn, starting first with: The nature of the invention described in the disclosures.
03:56 A. Right. What's the nature of the invention? The XP Bus, the cross-peripheral bus, a bus bridge.
03:56 Q. And in the context of Dr. Sarhan -- excuse me -- Dr. Sarhan's application of these claims here in court this week, what is the breadth of the claims, the full scope?
03:56 A. Well, he's claiming that it extends outside a bus bridge and goes all the way to, oh, let's build a new bus.
03:56 Q. How much direction or guidance is provided by the original patent disclosures in terms of how to build such a new interconnect as being pointed to by Dr. Sarhan?
03:56 A. None.
03:56 Q. What about the number of working examples?

What evidence did you see of that?

A. None.

Q. The next one is relative skill of those in the art. I believe you previously testified that the level of ordinary skill is a master's degree in electrical engineering or a bachelor's plus three years of work experience, correct?

A. That's correct.

Q. How does the level of skill factor impact your analysis?

A. So the question here is: Compared to a person of ordinary skill versus what you would expect somebody to -- require to do something like that, well, you heard from Mr. Bhatt, he got, you know, top people from Intel and from other companies to work on these new buses.

That's way beyond a person of ordinary skill in the art as I defined it as someone with a master's degree.

Q. So the level of skill you've defined was based upon what you were seeing in Dr. Chu's actual patent documents, the XP Bus, for example?

A. That's correct.

Q. But to build a new bus would require a whole 'nother level?

A. Much, much higher level.
Q. Okay. Next factor is: State of the prior art.
In the context of how Dr. Sarhan is applying these claims here in court, what is the state of the prior art?
A. So not much. We didn't have these, you know, fancy packet-based, super high-speed buses back in 1998. You know, we would've loved to have them, but it was a while before they could figure out there weren't examples there.
Q. Okay. And again, in the context of Dr. Sarhan's application of these claims to the full scope that he's claiming, what were your thoughts with respect to the predictability or unpredictability factor?
A. Right. So Mr. Bhatt almost made it sound easy, right? He went and got his minions from all sorts of companies and, you know, whole bunch of them worked together for a few years and they came out with a new bus standard.
Well, the number of failed examples of that kind of thing happening is pretty high. It's really hard to get these things just right.
And so as a result, you know, how predictable

03:59 is this? No. This is not something you just sit down and build. This is something you get very lucky with. It's very predictable (sic).

Q. The final factor is: Quantity of experimentation.

What was your analysis or opinion with respect to that factor?

A. Yeah. So again, Mr. Bhatt provided some examples there. It takes a lot of work to bring one of these things together. It's not something you sit down in a few weeks and say, oh, yeah. Let's design a new peripheral bus.

No. There are a lot of -- there's a lot of effort, which require a lot of people to work on for quite a long time. So quantity of experimentation involved is quite high.

MR. BURESH: If we could go to the next slide.

BY MR. BURESH:

Q. After considering all these factors, Dr. Edwards, what is your opinion with respect to whether Dr. Chu's written disclosures in the 1999/2000 time frame allowed a person of ordinary skill in the art to make and use an invention that utilizes the full scope that Dr. Sarhan is alleging here in case -- in

this case to include PCI Express and USB 3 without undue experimentation?

A. Broadly, no way. This patent is invalid. There's no way a person of ordinary skill in the art could take Dr. Chu's invention at the time and eventually turn it into even a core of PCI Express, even the core of USB 3.

Q. Okay. And we are looking at '359 patent, Claim 19; is that correct?

A. That's correct.

Q. What is your opinion with respect to the validity of that claim based on the enablement requirement?

A. Yeah. Again, it's invalid.

Q. And the same LVDS channel limitations are in each of the asserted claims, correct?

A. Correct.

Q. And they're being applied by Dr. Sarhan in the same way?

A. Yep. Same way. He's saying, oh, use my bridge bus to design a new bus. It's just -- I don't buy it.

Q. So how would the enablement opinion that you've just expressed apply to Claim 10 and Claim 13 of the '768 patent?

A. My conclusion is the same as before.
Q. Which is what?
A. That these claims are invalid.
Q. And that's based upon the enablement requirement that you analyzed?
A. That's correct.
Q. Considering all the claims together, then, that remain, the '359 patent, Claim 19, '768 patent, Claim 10 and Claim 13, is the enablement requirement satisfied by those claims based upon the full scope that Dr. Sarhan is asserting in this case?
A. Right. My opinion is the requirement is not met, and so as a result, these claims are invalid.
MR. BURESH: I pass the witness, Your Honor.

CROSS-EXAMINATION

BY MR. HALES:
Q. Dr. Edwards, it's good to see you this afternoon. How are you?
A. Hello.
Q. Today's not our first time speaking, right?
A. I actually can't recall. I guess you took one of my depositions. I honestly never remember who deposed me.
Q. It's often a blur for me as well. So we're in

04:02 the same boat.
04:02 Well, I'll remind you then that I had the pleasure of reading your noninfringement report and then deposing you to ask questions about that report.
04:03 A. Okay.
04:03 Q. The noninfringement opinions you've shared with the jury today are drawn from that report; is that right?
04:03 A. That's correct.
04:03 Q. Okay. Now, your noninfringement report, it's fair to say, was a joint effort between you and ASUSTeK counsel?
04:03 A. Yes.
04:03 Q. That's to say, you didn't draft that noninfringement report on your own, right?
04:03 A. No. I wouldn't put it that way.
04:03 (Bench conference.)
04:03 THE COURT: We're not getting into this.
04:03 MR. HALES: Got it.
04:03 THE COURT: Okay.
04:03 MR. HALES: Thank you.
04:03 (Bench conference concludes.)
04:03 BY MR. HALES:
04:03 Q. Dr. Edwards, I'd like to discuss your noninfringement opinions, if I may?

04:03 A. Okay.
04:03 Q. Dr. Edwards, you would agree that you do not know how to perform an infringement analysis, correct?
04:03 A. I said something like that during my deposition, but I think I gave you a few answers.
04:03 Q. What was your answer at the deposition?
04:04 A. I can't remember. I think I said something kind of snotty.
04:04 Q. Tell me, do you know how to perform an infringement analysis?
04:04 A. I do.
04:04 Q. Now, you remember at your deposition, you were under oath?
04:04 A. Yes.
04:04 Q. Your lawyer in a typical deposition, even if you can't remember this one specifically, would have been there via video conference, right?
04:04 A. That's correct.
04:04 Q. And in that deposition, we had a video camera?
04:04 A. That's correct.
04:04 Q. And a court reporter?
04:04 A. Yes.
04:04 Q. They recorded everything that you said?
04:04 A. Yes.
04:04 Q. And you were under an oath to tell the truth,

right?

A. That's correct.

Q. And you take that oath seriously?

A. Yes.

MR. HALES: Vicki, can you play clip No. ES 2622?

MR. BURESH: Your Honor, that is not proper impeachment. He needs to give me a chance to see what he's doing before he --

MR. HALES: I apologize. I'll give the cite. It's 206:22 to 207:1 of Dr. Edwards' infringement deposition.

MR. BURESH: Can you say that again?

MR. HALES: Yes. 206:22 to 207:1.

MR. BURESH: Okay. Go ahead.

(Video played.)

Q. Dr. Edwards, do you know how to perform an infringement analysis?

A. Of course not. I'm sure there are details that I will get wrong.

(End video.)

BY MR. HALES:

Q. Dr. Edwards, in the course of our deposition -- well, let me rephrase that question.

Dr. Edwards, you would agree with me there are

significant aspects of your patent infringement opinions that you got wrong in this case, correct?

A. No. I wouldn't put it that way.

Q. Okay. Let me be more specific.

Dr. Edwards, you would agree that patent infringement analysis is a two-step inquiry, right?

A. That's correct.

Q. At the first step, we construe or define the scope of the claim terms, right?

A. Yes.

Q. And to do that, we will apply the Court's constructions and the plain and ordinary meaning of a term?

A. Yes.

Q. You would agree, though, that in forming your infringement opinions, you went beyond these two sources of information, right?

A. No. I wouldn't say that.

Q. You also considered how ACQIS seems to be interpreting the claims, didn't you?

A. Let's see. Yes. I was considering that.

Q. And it's improper to consider this third source of evidence when construing the claim terms for purposes of infringement.

You'd agree with that statement?

04:06 A. Let's see. Yes.
04:06 Q. You did this, though, because you were having trouble understanding the Court's claim constructions; is that right?
04:07 A. I may have said that.
04:07 Q. Is it true?
04:07 A. I don't know.
04:07 Q. Because you considered some of the -- well, let me rephrase my question.
04:07 You considered some of the Court's constructions somewhat vague and that's why you looked how -- at how ACQIS seemed to be interpreting them to help inform your opinion, correct?
04:07 A. Yes.
04:07 Q. And the way ACQIS presented its infringement case influenced how you're interpreting the claims, right?
04:07 A. No. I wouldn't put it that way.
04:07 MR. HALES: Vicki, can you please pull up the same deposition transcript at 238:4 to 16?
04:08 (Video played.)
04:08 Q. So the way that ACQIS is presenting --
04:08 (Video ends.)
04:08 MR. HALES: I'm sorry. Can you pull up the actual transcript?

MR. BURESH: Can you ask your prior question again, counsel?

MR. HALES: Sure.

BY MR. HALES:

Q. Dr. Edwards, the way ACQIS presented its infringement case influenced how you're interpreting the claims, right?

A. Let's see. Not during the infringement analysis. I certainly considered how ACQIS was interpreting the claims and the scope at other times.

Q. In any event, you would agree with me that it's inappropriate argument to consider a patent infringer's allegations and informing the scope of a claim for purposes of an infringement analysis, correct?

A. Yes.

Q. What role did ACQIS' interpretations of the claims play in your infringement analysis?

A. I don't believe they did.

MR. HALES: Vicki, will you please pull up 209:7 to 20?

(Video played.)

Q. What role does ACQIS' --

(Video ends.)

MR. HALES: Again, will you please pull

04:09 up the deposition transcript itself?

04:09 BY MR. HALES:

04:09 Q. Dr. Edwards, do you see where I asked you what role does ACQIS' interpretations of the claims play in your infringement analysis?

04:10 A. Yes.

04:10 Q. And you answer: Let's see. Because some of the Court's constructions are somewhat vague, I looked at how ACQIS seemed to be interpreting them as well to help inform my opinion.

04:10 Do you see that?

04:10 A. Yes.

04:10 Q. Because you've done this in forming your opinions, you would agree there's an obvious question about whether when you performed your infringement analysis, you did it improperly, right?

04:10 A. I wouldn't put it like that.

04:10 MR. HALES: Vicki, will you please pull up 251:8 to 25 in transcript form?

BY MR. HALES:

04:10 Q. Dr. Edwards, if you can follow along on your screen from Line 8.

04:10 A. Yeah.

04:10 Q. The improper analysis that you just discussed, is that the manner in which you've conducted

infringement analysis until this point, until Mr. Schmidt straightened you out?

Answer: Well, let's see. The conclusions are still the same. It's, you know, this worrying about the full-scope enablement. So I understand that that's inappropriate. That's an inappropriate argument now to be making specifically in infringement analysis.

But when you gave me testimony saying that you considered the full scope of the claim as clarified by ACQIS' allegations, that was the true understanding you had of how to perform the infringement analysis up to --

MR. BURESH: Your Honor, this is not impeachment. He hasn't asked a question, and he's just reading multiple questions out of a transcript. I object.

MR. HALES: The question I asked directly tracks the answer on 23 to 25.

THE COURT: Well, I'm having a hard time, when you're reading it like that, following you. But why don't you go back and ask him the question again. And you can -- you can use that again if you think you need to.

BY MR. HALES:

Q. Dr. Edwards, we established at times in

forming your infringement opinions, you considered ACQIS' allegations to inform those opinions, correct?

A. Let's see. It looks like that's what it says in the transcript.

Q. Okay. And in considering the full scope of the claim as clarified by ACQIS' allegations, you would agree there's an obvious question about whether, when performing your analysis, you did so properly?

A. No. I wouldn't agree with you on that.

MR. HALES: Can we bring that same portion back up, Vicki, 251:8 to 25?

BY MR. HALES:

Q. I'll start from Line 17:

But when you gave me testimony saying that you considered the full scope of the claim as clarified by ACQIS' allegations, that was the true understanding of how -- you had of how to perform an infringement analysis up to and until your counsel talked to you during the bio break?

Answer: Let's see. So there's an obvious question about whether when I was performing the analysis, I did it improperly.

Do you see that?

A. Yes.

MR. BURESH: Your Honor, he needs to

complete his answer if he's going to impeach him with half an answer.

THE COURT: Is that not the entire answer?

MR. BURESH: That is not the entire answer.

THE COURT: Yes. You have to give the entire answer.

MR. HALES: I'm happy to have you -- go to the next page, Vicki.

Claim construction and the scope and all the rest of it should somehow all be consistent, but I don't see that consistency to cross --

MR. BURESH: You're not reading from the right place.

MR. HALES: Am I not? I'm sorry.

So certainly in the last few minutes, it's likely that I was understanding and getting some aspects of the law conflicted -- conflated. But I'm not aware that that confusion leaked into my report per se.

I mean, you've been asking me to point out this or whatever. You're asking me, you know, oh, what am I looking at here, what do I understand now as opposed to, oh, what did I say in my report?

BY MR. HALES:

04:13 Q. Did I read that accurately?

04:13 A. Yes.

04:13 Q. Okay. I'd like to analyze whether you see limitations in the claims that don't appear in the claims. Okay?

04:14 Dr. Edwards, do you know what the term "hot-plugging" means?

04:14 A. Yes.

04:14 Q. Broadly speaking, you'd agree that hot-plugging means that I can insert or remove something from a computer system without having to turn the computer system off first, right?

04:14 A. That is fair.

04:14 Q. And when you interpreted the claims, you concluded that hot-plugging is necessary to cover the full scope that ACQIS appears to be claiming?

04:14 A. I can't recall.

04:14 MR. HALES: Vicki, can you bring up the transcript at 203:16 to 24?

04:14 BY MR. HALES:

04:14 Q. Do you see at Line 16 where I asked: Under your interpretation of the asserted claims, do you understand any limitation to relate to hot-plugging?

04:14 Your answer: Let's see. Under my

interpretation of the claims informed by what's going on in the case, including your accusations, yes. It seems like hot-plugging is necessary to cover the full scope that you appear to be claiming.
Do you see that?
A. Yes.
Q. Okay. But you would agree that no patent claim asserted in this case has any limitations relating to hot or plug?
A. Repeat your question again.
Q. You would agree that no patent claim in this case has any claim limitations reciting the words "hot" or "plug"?
A. That's correct.
Q. Okay. The Court hasn't delivered any constructions about hot-plugging being within the meaning of any of the claim terms?
A. That's correct.
Q. And you've chosen not to share any noninfringement opinions with the jury today relating to hot-plugging?
A. That's correct.
Q. Okay. Dr. Edwards, are you familiar with the term "clock" as used in computer engineering?
A. Yes.

04:15 Q. And a clock refers to a signal that regulates the timing and speed of a certain unit, correct?
04:15 A. That's a reasonable definition.
04:15 Q. Okay. And in forming your infringement opinions in this case, you analyzed how ACQIS interpreted the claims and concluded that a specific type of clock was an inherent requirement of the patent claims, correct?
04:15 A. Let's see. Yes. I did.
04:16 Q. Okay. You haven't shared any opinions with the jury today about a clock being a necessary limitation of the claims?
04:16 A. That's correct.
04:16 Q. Dr. Edwards, you know what error correction is, right?
04:16 A. Yes.
04:16 Q. An error correction, broadly speaking, is a computer's ability to analyze information received over a channel, detect any errors, and fix errors in that information, right?
04:16 A. Yes.
04:16 Q. And because of the way ACQIS presented its infringement case, you interpreted the PCI-related limitations of the asserted claims to require some form of error correction in an accused device for that

accused device to infringe, correct?

A. Sorry. What context are you...

Q. In the context of the claims that have been asserted in this case, have you determined that they require error correction?

A. Let's see. I can't recall what I put in my report. I've not discussed them here.

Q. I'm asking for your opinions in analyzing the claims.

Have you concluded that they must require error correction?

A. Let's see. Yeah. I can't recall. I don't think I did. Certainly not my opinion now.

Q. Has your opinion changed over time, Dr. Edwards?

A. No.

MR. HALES: Vicki, can you please bring up 239:1 through 240:3?

BY MR. HALES:

Q. Question: Okay. So because of the way ACQIS is presenting its infringement case, you interpret the PCI-related limitations of the asserted claims to require some form of error correction in an accused device for that accused device to infringe?

Answer: Broadly, the claims are saying

"conveys," which I interpret to mean successfully conveys. And, as I've mentioned before, to successfully convey something in a setting like this, you need some sort of error correction mechanism. So I understand it to be necessary.

Do you see that?

A. Yes.

Q. Okay. And you haven't chosen to share that infringement opinion with the jury today?

A. That's correct.

Q. Okay. Dr. Edwards, what -- I guess I'll ask you a new question.

This interpretation of the claims, is this a part of your full-scope analysis of claim terms?

A. Part of my full-scope analysis of claim terms. I'm not sure what you're referring to.

Q. Do you remember the term "full scope"?

A. I think -- well, I understand the term "full scope." Yes.

Q. Have you applied the full-scope understanding of the claim terms in arriving at your infringement opinions?

A. Yes.

Q. You'd agree it's improper to apply the full-scope understanding of a claim term in rendering

04:18 an infringement opinion, correct?
04:18 A. Yes.
04:18 Q. Dr. Edwards, you've shared the opinion that
04:19 the term "LVDS," as used in the asserted patent claims,
04:19 refers to a specific type of low-voltage differential
04:19 signaling; is that right?
04:19 A. No. I wouldn't put it that way.
04:19 Q. Do you -- let me see if I've understood your
04:19 opinion then.
04:19 LVDS, as used in the claims, requires the
04:19 presence of a bus bridge?
04:19 A. Let's see. The LVDS channels refer to a bus
04:19 bridge, so that's not quite what you said.
04:19 Q. I'm sorry. Was that an affirmative answer to
04:19 my question? LVDS channels do require a bus bridge?
04:19 A. I guess I don't -- I wouldn't say it that way.
04:19 Q. I'm trying to understand your LVDS opinions.
04:19 If a technology is described as low voltage
04:19 and differential signal, is that an LVDS technology?
04:19 A. No. I wouldn't say that.
04:19 Q. What is required for something to be an LVDS
04:19 technology under the patent claim terms, sir?
04:20 A. Oh, well, we've been discussing it at length.
04:20 So we look at it, Dr. Chu had the LVDS manual --
04:20 Q. Is LVDS the technology in the LVDS manual,

Dr. Edwards?

A. Sorry. Which LVDS technology are you referring to?

Q. You've talked about the National Semiconductor manual, 1997.

A. Yes.

Q. Is that the LVDS technology we should be looking for in trying to investigate infringement?

A. In part, that would be an example.

Q. Provide a concise definition for me of LVDS.

A. Well, you start with the National stuff, because we know Dr. Chu refers to that. Then --

Q. Can you not provide a concise definition, sir?

THE COURT: No, no, no. You asked him to explain it. He gets to explain it.

BY MR. HALES:

Q. Please proceed.

A. Let's see -- so the short answer is: No. I don't think I can provide a concise answer.

How I arrived at this is I started with the National stuff and then looked at the disclosures in -- in the patents, the early stuff, and then applied what I understood a person of ordinary skill in the art would have understood at the time.

Q. Dr. Edwards, you were present in the courtroom

when we reviewed the PCI Express manual?

A. That's correct.

Q. And the PCI Express manual describes its fundamental link as low-voltage differential signal pairs.

Do you remember seeing that disclosure?

A. That's correct.

Q. That's an LVDS channel, correct?

A. I wouldn't put it that way.

MR. HALES: Vicki, will you please bring up Exhibit J-1, Page 51, Lines 14 to 16 of Column 4, please?

BY MR. HALES:

Q. Do you see this disclosure of the '768 patent?

A. Yes. I see that.

Q. And here, the patentee says that: The term "LVDS" is used herein to generically refer to low voltage differential signals.

Do you see that?

A. Yes.

Q. Do you see where the patentee says further: And is not intended to be limited to any particular type of LVDS technology?

A. Yes.

Q. So when the PCI Express standard describes

04:22 itself as low voltage differential signaling, should we apply the patent's teachings here and consider that it too is a LVDS technology?
04:22 A. No. I don't see why you would. I'd be happy to explain, though.
04:22 Q. Would applying the term "LVDS" generically to other low voltage differential signal technologies be a faithful application of this teaching of the patent?
04:22 A. Let's see. Repeat your question, please.
04:22 Q. Would applying the term "LVDS" to the low voltage differential signaling of PCI Express be a faithful application of this disclosure of the patent?
04:22 A. No.
04:23 Q. Does this patent say to start with the 1997 version of the LVDS manual that we've reviewed?
04:23 A. Those words don't appear. Is that what you mean?
04:23 Q. I'm asking if the patent has directed you to perform the analysis you just described. You said you start with the 1997 LVDS manual and work out from there.
04:23 Has that been said in this patent anywhere?
04:23 A. It lists the manual.
04:23 Q. Where does it list the manual?
04:23 A. Sorry?

04:23 Q. Where does it list the manual?
04:23 A. I believe it's in the list of reference. I believe it's also mentioned in the incorporated by reference documents.
04:23 Q. Who adds the list of references to the patent? Is that added by the patentee, or is that added by the patent examiner?
04:23 A. I actually don't know.
04:23 Q. In any event, because it was in the list of references cited, you would agree that the patent examiner has reviewed that 1997 LVDS manual, correct?
04:24 A. I would assume so.
04:24 Q. And that the patent issued despite the patent examiner reviewing the 1997 LVDS manual, correct?
04:24 A. Yes.
04:24 Q. So the patent examiner must have concluded that this manual does not disclose the technology claimed in Dr. Chu's patents.
04:24 Do you agree with that statement?
04:24 A. I wouldn't put it that way.
04:24 Q. You'd agree, Dr. Edwards, that no asserted claim calls for the conveyance of a full PCI local bus transaction, correct?
04:24 A. Yes.
04:24 Q. In fact, every claim with PCI limitations

calls only for address and data bits of a PCI local bus transaction, correct?

A. Correct.

Q. Hardware in the computer context means something physical, something you can touch?

A. Yes.

Q. Address and data bits are electrical signals, correct?

A. Correct.

Q. Dr. Edwards, you would agree that each accused product practices PCI Express standards, correct?

A. Yes.

Q. And you would further agree that PCI Express standards were developed to be backwards software compatible with PCI local bus specification, correct?

A. No. I wouldn't put it that way.

MR. HALES: Vicki, will you please bring up 115, Lines 16 to 23 of Dr. Edwards' deposition?

BY MR. HALES:

Q. But you would agree that the PCI Express standard was developed to be backward software compatible with the local -- PCI local bus specification?

I'm reading your words from Paragraph 101.

Answer: Oh, yes. As I described. And

04:25 there's many more details to that. But yes. Your reading of it is correct.

04:26 Did I read that correctly?

04:26 A. You did.

04:26 Q. Thank you.

04:26 Put simply, backwards software compatibility means that legacy PCI local bus software could continue to work in a PCI Express system, right?

04:26 A. Say that again.

04:26 Q. Put simply, backwards software compatibility means that legacy PCI local bus software could continue to work in a PCI Express system, correct?

04:26 A. Correct.

04:26 Q. You'd agree, Dr. Edwards, that a CPU may use PCI local bus software to issue what is called a memory write instruction, correct?

04:26 A. Let's see. That sounds like you're quoting. That's not quite right.

04:26 Q. Should I change the word "instruction" to something else?

04:26 A. Please ask the question again.

04:26 Q. You would agree, Dr. Edwards, that a CPU may use a PCI local bus software to issue what is called a memory write instruction?

04:26 A. No. I wouldn't put it that way.

Q. CPUs may use PCI local bus software to issue a memory write, correct?
A. To issue a memory write. Yeah. I still wouldn't put it that way.
Q. What if I use the word "operation"?
A. Yeah. Again, that's not consistent with my -- with how I would phrase it.
Q. If a CPU uses PCI local bus software to issue a memory write command, would that include both address and data bits?
A. Okay. Please repeat the question. You're using words in a way I'm not familiar with.
Q. Dr. Edwards, I'll move on for Rule 36.
I'd like to investigate your understanding of the term "backward compatibility."
A. Yes.
Q. You don't include a definition for backward compatibility in your report, do you, your infringement report?
A. I don't believe I do.
Q. And weeks later when you were deposed, you still hadn't come up with a definition for backward compatibility; is that right?
A. No. I wouldn't say that.
Q. So you came up with a definition for backward

compatibility after you wrote your report?
A. No.
Q. Did you include it in your report?
A. I did not include a definition in my report.
Q. And in that report, you delivered the opinion that there is no backward compatibility between PCI Express transactions and PCI local bus transactions?
A. That sounds right.
Q. Okay. Whatever your definition for backward compatibility, you agree that backward compatibility should be informed by a study of the disclosures of the asserted patents, right?
A. I'm not understanding that question. Can you phrase it differently?
Q. Sure.
If someone wants to understand what backward compatibility means in the Court's construction, the Court has told us that backward compatibility is a way to be in accordance with the PCI local bus specification.
You remember reviewing that at construction?
A. Yes.
Q. Okay. That concept, backward compatibility, that will be informed by the teachings of the asserted patents, correct?

A. Yes.

MR. HALES: Vicki, will you please -- forget that, Vicki.

BY MR. HALES:

Q. Dr. Edwards, do you remember putting up a slide on the screen that had the PCI Express plug next to the PCI local bus plug?

A. Yes.

Q. And I think the point you wanted to illustrate there was that these two plugs cannot accept the same connectors, right?

A. Yes.

Q. But you would agree that this is different from the backward compatibility taught in the asserted patents, right?

A. Let's see.

Q. I'll be more specific.

Did Dr. Chu criticize the PCI local bus for having a bulky and cumbersome connector?

A. Yes.

Q. And he said it had too many pins?

A. Yes.

Q. And when he depicted his use of his XP Bus in the figures, he didn't use a PCI local bus connector to bridge the ACM and the console, did he?

A. That's correct.
Q. So he used a new type of connector, not the old PCI local bus connector, right?
A. That's correct.
Q. But the XP Bus was taught to maintain compatibility with PCI local bus and be able to convey the address and data bits received from the PCI local bus, right?
A. Yeah. That's not quite right.
Q. Can the XP Bus, as disclosed in the patents, accept address and data bits from a PCI local bus transaction?
A. They can.
Q. And it would convey it over the XP Bus?
A. Yes.
Q. Notwithstanding that its connector is different from the PCI local bus, correct?
A. That's correct.
Q. Okay. Dr. Edwards, to find backward compatibility, you would anticipate the same electrical signals would be used in the old and new versions of the technology, right?
A. The beginning of your question was garbled. Can you say it again?
Q. To find backward compatibility, you would

04:31 anticipate that the same electrical signals would be used in the old and new versions of the technology, right?

04:31 A. Generally, I would expect that.

04:31 Q. But you would agree this is the opposite of what the patent teaches, correct?

04:31 A. No. I wouldn't put it that way.

04:31 Q. Doesn't Dr. Chu criticize the PCI local bus as requiring a high voltage amount?

04:31 A. Yes.

04:31 Q. And he says it would be an advantage to replace it with LVDS in which you could reduce the amount of power consumed?

04:31 A. Yes.

04:31 Q. And that's, in fact, what he did with the XP Bus, right, is he got rid of PCI local buses, the bridge between his ACM and his console, right?

04:32 A. So he proposed doing that. Yes.

04:32 Q. And out of his new connector to bridge these two, he's now using the electrical requirements of LVDS, not of PCI local bus, right?

04:32 A. Yes.

04:32 Q. So Dr. Chu's version of backward compatibility is new connector, new electrical signaling?

04:32 A. No. I wouldn't put it that way.

Q. We agree that he has a new connector, right?
A. Yeah.
Q. He's not using the PCI local bus connector?
A. That's correct.
Q. He has new signaling voltage levels, right?
A. No. I would not agree with that.
Q. Does he not say that LVDS will consume less power than PCI local bus?
A. He does say that.
Q. Okay. Dr. Edwards, we don't disagree that PCI Express remains software backward compatible with PCI -- PCI Express remains software backward compatible with PCI local bus, correct?
A. We discussed that earlier.
Q. Is that a yes?
A. I don't remember exactly what I said then.
Q. I'll ask you anew.
Is it software backwards compatible or not?
A. I wouldn't phrase it exactly that way.
Q. Dr. Edwards, the claims asserted in this -- in this case just claimed generically USB protocol data or USB protocol information.
Would you agree with that statement?
A. Yes.
Q. They don't refer to a specific generation of

04:33 USB?
04:33 A. That's correct.
04:34 Q. And the USB ports of the accused products, you'd agree, are capable of conveying USB protocol data?
04:34 A. Yes.
04:34 Q. And the USB ports of the accused products are capable of conveying USB protocol information, correct?
04:34 A. Yes.
04:34 Q. And you don't dispute that the USB 3 ports of the accused products use low voltage differential signaling, do you?
04:34 A. I wouldn't put it that way.
04:34 Q. Specifically, the USB 3 protocol has the old signal channels from USB 2.
04:34 You'd agree with that?
04:34 A. Yes.
04:34 Q. And two new channels called SuperSpeed channels?
04:34 A. Yes.
04:34 Q. These are the low voltage differential signaling channels, aren't they?
04:34 A. No. I would not say it that way.
04:34 MR. HALES: Vicki, will you please bring up D-204731, which is Paragraph 160 of Dr. Edwards'

04:34 invalidity report?

BY MR. HALES:

04:35 Q. Are we looking at your invalidity report, Dr. Edwards?

04:35 A. Yes.

04:35 Q. Do you see where you say: A USB 3.0 cable is effectively a USB 2.0 cable with two additional differential pairs that carry the SuperSpeed bus signals. The additional pairs use low voltage differential signaling, one pair in each direction?

04:35 A. Yes.

04:35 Q. And if we were to abbreviate low voltage differential signalling, that would abbreviate to LVDS?

04:35 A. I wouldn't put it that way.

04:35 Q. I'm asking it just as a matter of fact.

04:35 If we take the first letter of each of those words, would it abbreviate to LVDS?

04:35 A. It would.

04:35 Q. Okay. Dr. Edwards, I'd like to discuss your invalidity opinions briefly.

04:35 The written description requirement, as you understand it, does not require that the patentee prove that he has already developed a physical version of what he claims as his invention, correct?

04:36 A. Correct.

04:36 Q. You would agree that the patentee does not need to disclose information that is known and well understood in a patent specification to satisfy the written description requirement, correct?
04:36 A. That's correct.
04:36 Q. LVDS was known in 1997?
04:36 A. Which one are you referring to?
04:36 Q. You've shown me a manual for an LVDS technology published by National Semiconductor.
04:36 A. Yes. That was certainly available.
04:36 Q. I think you called this technology "off-the-shelf technology"?
04:36 A. That's correct.
04:36 Q. Okay. The test for written description is whether the specification demonstrates to a person of skill in the art that the patent applicant actually had invented the subject matter claimed in the patent claims, right?
04:36 A. Correct.
04:36 Q. We don't go and look at an accused product to perform this analysis; we look at the patent claims, right?
04:36 A. To perform which analysis? I lost you.
04:36 Q. The written description analysis.
04:36 A. The written description analysis. Right.

That's correct.

Q. Okay. So the thing that needs support in the written portion of the patent is what is actually claimed in the claims, right?

A. Yeah.

Q. Okay. So when you perform your analysis toward the end of your slide deck and you scratch out the claim terms and replace them with accused technology, you would agree you're not looking for what is actually found in the claims, correct?

A. I wouldn't put it that way.

Q. You depicted it that way in your slides, didn't you?

A. That's true.

Q. The same is true of the enablement requirement. The only thing the patentee has to enable others in the field to do is make and use what's actually claimed without undue experimentation; is that right?

A. That's correct.

Q. And LVDS was known in the field?

A. Again, I don't know what antecedent. The National Semiconductor LVDS?

Q. LVDS as a technology was known in the field in 1999?

A. There were instances of LVDS known.
Q. USB was widely known in the field at the time?
A. That's true.
Q. And USB was already a serial technology, right?
A. Yes.
Q. The LVDS image you showed us, in fact, had a serializer so it could even take in parallel data and send it over the channel, right?
A. Yes.
Q. Okay. Some amount of experimentation is okay in the enablement requirement, right?
A. Yes.
Q. The test is whether it's undue experimentation; is that right?
A. That's my understanding.
Q. One attempt at developing a chip is not undue experimentation, correct?
A. I'm not sure.
Q. Okay.
A. I've not done that analysis.
Q. You haven't analyzed whether a single try at developing a chip is too many tries?
A. I'd have to think of that -- look at that test carefully. Undue experimentation, there's a specific

04:38 set of factors. I've not done the analysis.
04:38 Q. You haven't done the analysis of how many tries to develop a chip would be too many under the undue experimentation test of the enablement requirement?
04:39 A. That's correct.
04:39 Q. But you've opined today that these patents are invalid for lack of enablement, right?
04:39 A. That's correct.
04:39 Q. You would agree that a patentee has no obligation to enable every aspect of an accused product, correct?
04:39 A. Correct.
04:39 Q. None of the accused patent claims require the entire PCI Express industry standard, do they?
04:39 A. No.
04:39 Q. They just recite an LVDS channel to convey certain information, right?
04:39 A. I believe that's the -- I believe that's the language used. Yes.
04:39 Q. And the PCI local bus was well-known at the time?
04:39 A. That's correct.
04:39 Q. USB was well-known at the time?
04:39 A. Yes.

Q. LVDS and serializers were known at the time?
A. Yes.
Q. Because the asserted claims do not claim every feature of PCI Express, you would agree that the patent does not have to have written description support for every feature found in PCI Express, correct?
A. That's correct.
Q. Same question as to USB 3, would you provide the same answer?
A. Yes.
Q. Okay. The claims define the scope of Dr. Chu's inventions, right?
A. Certainly that's the beginning of the statement. Yes.
Q. Do the patent claims define the scope of the invention or don't they?
A. I wouldn't put it just that way.
Q. Okay. In any event, you'll agree that the '886 patent application from 1998 -- you remember showing that in about 30 slides of your presentation?
A. Yes.
Q. Does that define the scope of Dr. Chu's invention?
A. Not exactly.
Q. Okay. So too with the May 1999 application, I

think we saw two different ACMs and a tower.
Do you remember displaying that to the jury?
A. Yes.
Q. Does this define the scope of Dr. Chu's invention?
A. Not in its entirety.
Q. Okay. You've opined that the thing that was enabled, the thing that was described in these patents, was a bus bridge, right?
A. Yes.
Q. Specifically, the XP Bus, which was an LVDS bus bridge, correct?
A. Correct.
Q. I wrote down a couple of statements.
You're of the opinion that Dr. Chu was always teaching how to use a bus bridge?
A. He referenced -- yeah.
Q. And he taught others how to use a bus bridge, correct?
A. Yes.
MR. HALES: Okay. Vicki, will you please pull up Dr. Edwards' invalidity report?
(Off-the-record discussion.)
MR. HALES: Do you think we'll manage it, Vicki, or should I go to my next question?

I don't need a page. I need you to do a control-F search.

BY MR. HALES:

Q. While Vicki's pulling it up, I want to ask a different question.

Dr. Edwards, you take issue with Dr. Sarhan's interpretation of the term "console"; is that correct?

A. Let's see. I wouldn't phrase it exactly that way.

Q. You don't agree with Dr. Sarhan's conclusions about satisfaction of the console limitation found in the asserted claims, correct?

A. Correct.

Q. Specifically, you are searching for a device that actually connects a bunch of different peripherals to a computer system, correct, instead of the peripherals themselves?

A. Yes.

Q. You're aware of consoles that exist that can connect to the accused laptop product, correct?

A. No. I'm not.

Q. Dr. Edwards, you would agree that the modern analog to the console described in Dr. Chu's patents is a laptop dock, correct?

A. I haven't considered that.

MR. HALES: Vicki, will you please pull up Paragraph 59 of Dr. Edwards' infringement analysis or rather his noninfringement report?

I actually need the invalidity report. This is the noninfringement report. I need the other one.

(Off-the-record discussion.)

BY MR. HALES:

Q. Dr. Edwards, what am I holding right here?

A. I can't see.

Q. Would you like me to hand it to you?

A. Yes, please.

MR. HALES: Your Honor, may I approach?

THE COURT: Of course.

BY MR. HALES:

Q. Dr. Edwards, do you recognize that as a laptop dock?

A. Let's see. So it's labeled here as a ThinkPad Thunderbolt 4 Workstation Dock. So yeah. It would probably be referred to as a laptop dock.

Q. Would it be accurate to describe a laptop dock as a modern analog to the console disclosed in Dr. Chu's patents?

A. Let's see. Yeah. In a manner of speaking.

Q. And that device has a chassis?

A. Yes.
Q. It has ports for connecting to other computing devices?
A. Yes.
Q. And specifically on the back, if you'll turn it around so the jury can see, it has about ten different types of ports; is that right?
A. Yes.
Q. It has a LAN port?
A. Yes.
Q. An HDMI port?
A. Yes.
Q. Two display ports?
A. Yes.
Q. And about three or four different USB 3 ports?
A. Let's see. Probably.
Q. A user can attach a hard drive to that device via those USB ports, correct?
A. Yes.
Q. And a monitor via the display outputs?
A. Yes.
Q. And a CD-ROM to the USB 3 port, correct?
A. Yes.
Q. And then when the user attaches their laptop to this device, all of those attached devices will be

available to the laptop, correct?
A. Correct.
Q. And the laptop can display its screen onto the attached monitors, right?
A. Correct.
Q. Dr. Edwards, is that a console?
A. No.
Q. Dr. Edwards, that has a chassis?
A. It does.
Q. That has ports for connecting to other computing devices?
A. Let's see. Yes.
Q. And that, just like the console in the asserted patents, will allow for the connection of peripherals that can be made available to a computing device, correct?
A. That's correct.
Q. Okay. And if we looked inside that chassis, we're going to see components of computing systems, correct?
A. No.
Q. Would we see a processor?
A. I don't know.
Q. What about USB 3 hardware? Will we see that in there?

A. Yes.

Q. HDMI hardware?

A. Yes.

Q. These are computer components, correct?

MR. BURESH: Your Honor, this isn't an accused product. Neither expert has analyzed this thing. I don't know why we're even talking about it.

What is this relevant to?

MR. HALES: He's a professor of computer systems, a Ph.D. in electrical engineering, and he's opined in his noninfringement report that the closest analog to a console modernly is a laptop dock.

THE COURT: Your objection's under 401?

MR. BURESH: Yes, Your Honor.

THE COURT: Sustained.

MR. HALES: I'll retrieve that dock, sir.

I yield the witness. Thank you.

REDIRECT EXAMINATION

BY MR. BURESH:

Q. Hello again, Dr. Edwards.

A. Hello.

Q. I'm going to try something. Go off the leash here a little bit and try a projector.

And, Dr. Edwards --

MR. BURESH: You can go ahead and publish

04:49 this to the jury.
04:49 BY MR. BURESH:
04:49 Q. My colleague played some videotape from your deposition.
04:49 Do you recall that?
04:49 A. Yes.
04:49 Q. The piece he played, he had asked you, Dr. Edwards, do you know how to perform an infringement analysis?
04:50 Do you recall that?
04:50 A. Yes.
04:50 Q. And then on the video, you had said: Of course not. I'm sure there are details that I will get wrong.
04:50 You see that?
04:50 A. Yes.
04:50 Q. And then the video stopped. Right?
04:50 A. Correct.
04:50 Q. Now, the next question was: Do I understand your answer correctly? You do not know how to perform an infringement analysis?
04:50 You see that?
04:50 A. Yes.
04:50 Q. And your answer was: Of course you misunderstood me.

A. Yes.
Q. Right?
A. Yes.
Q. So what was played in front of the jury, it wasn't the full story. It wasn't your actual full answer, right?
A. That's correct.
Q. Because you know how to do an infringement analysis, don't you?
A. Yes. I said two different things there.
Q. You gave him two answers, and he just played the first one and cut off the second?
A. That's correct.
Q. Okay. How many times have you done an infringement analysis in your career as a consultant that you do 10 percent of your time?
A. I've lost count. Probably tens of times at least.
Q. Now, the infringement analysis that you set forth in your report, are you 100 percent confident that you did that correctly?
A. Yes.
Q. Now, the infringement analysis that you presented to this jury, are you 100 percent confident that you did that correctly?

A. Yes.

Q. Now, there was some questions about hot-plugging and error correction and whatever those things are.

Do you recall that?

A. Yes. I remember.

Q. And you put some opinions about some of that stuff in your report, right?

A. That's correct.

Q. Now, is it fair to say that there's some opinions in your report that weren't presented to the jury?

A. Very, very many little details.

Q. Because there's a lot of very technical stuff, right?

A. I forget how many hundreds of pages long it is. But yes. No. I spared the jury from a lot of that.

Q. But you presented your key opinions to the jury; is that correct?

A. That's correct.

Q. There were some questions about that device that was slung at you there at the end.

Do you remember that?

A. Yes.

Q. Was that an accused product?
A. No.
Q. Was that anything that had come from ASUSTeK?
A. No. It was from Lenovo, one of their competitors.
Q. Okay. Had Dr. Sarhan talked about that?
A. I hadn't seen him do anything like that.
Q. Now, you've read his report.
Did Dr. Sarhan talk about that product that they tossed up to you?
A. No.
Q. You didn't get an opportunity to consider that product in advance of today?
A. I'd never seen that one before.
Q. There was a series of questions about the XP Bus being a new connector compared to PCI local bus.
Do you recall that?
A. More or less. Okay.
Q. And something to the effect of, well, backwards compatibility must not look for a connection because you have XP Bus on one side and PCI local bus on the other, right?
A. That sounds about right.
Q. And they would have different connectors?
A. Yes.

MR. BURESH: Let's pull up Figure 11 from the May 1998 provisional application. Well, actually, I already have this up. Let me just do it here.

BY MR. BURESH:

Q. Okay. Now, if we want to connect that PCI local bus in Figure 11 or carry that data on to the XP Bus, what do we have to have in between?

A. A PCI local bus -- or I'm sorry. Let me understand exactly what you're pointing to. Actually, could you use a pen or something to show me?

Q. Well, I'm not that technical.

A. Okay.

Q. But it's the host interface controller that's right in between them.

A. Oh, between the PCI and the XP Bus.

Q. And why does that host interface controller need to be there?

A. Oh, it's doing the conversion between the PCI signaling and protocol and the XP Bus protocol signaling wiring.

Q. So it's not like you're taking an XP Bus and just plugging it into a PCI local bus, is it?

A. Hardly plugging. You've got that chip in there that's doing a lot of work.

Q. Because you have to convert from one to the

other to get across that bridge, right?
A. Correct.
Q. Now, in PCI Express, is there any converter that connects it in any way to a PCI local bus?
A. Not in any of the accused products.
Q. Because PCI local bus is obsolete. There's no reason to be doing that?
A. Nobody -- nobody puts these in computers anymore. Certainly not ASUSTeK.
MR. BURESH: Could you pull up Defense Exhibit 950, please?
BY MR. BURESH:
Q. LVDS technology from the National Semiconductor, correct?
A. Correct.
Q. That's a brand, isn't it?
A. National Semiconductor is a brand. LVDS is one of their brand -- one of their brands.
Q. Okay. So when we're looking for LVDS, we're talking about a specific thing, aren't we?
A. Yes.
Q. I'll try a little example. I love -- this is a guilty pleasure. I love IHOP. Okay. The food's affordable, and I can get lots of it, which when the boys were growing up, it's a place we went to a lot.

04:56 Now, IHOP stands for what? Do you know?
04:56 A. It's an acronym for International House of Pancakes, if I remember.
04:56 Q. Okay. So International House of Pancakes, if we abbreviate it, it becomes IHOP?
04:56 A. Correct.
04:56 Q. Does that mean -- let me try this. A McDonald's, all right? Now, there are McDonald's all over the world.
04:56 A. Yes.
04:56 Q. So it's international?
04:56 A. Absolutely.
04:56 Q. Now, restaurants are often called houses. Front of house, back of house?
04:56 A. That's fair.
04:56 Q. And McDonald's sells pancakes. They're not anywhere near as good, in my opinion, as IHOP, but McDonald's sells pancakes?
04:56 A. Absolutely.
04:56 Q. Okay. So McDonald's could be called an international house of pancakes, right?
04:56 A. Yes.
04:56 Q. But would anybody think that McDonald's is an IHOP?
04:56 A. No.

04:56 Q. Because it's not. Because IHOP's a thing. It's a brand, right?

04:57 A. Yeah. IHOP is a brand name. People treat it like it's a word even though it has a expansion as a -- as an acronym.

04:57 Q. So just because some technology has differential signaling that's been around for 50 years --

04:57 A. Yes.

04:57 Q. Are you with me?

04:57 -- and that uses, I guess, voltage that's lower than something else, whatever low is?

04:57 A. Yes.

04:57 Q. Now, just because you could say that, that doesn't mean it's LVDS, does it?

04:57 A. Correct. Not in this -- not in these patents.

04:57 Q. Because in these patents, LVDS has a specific connotation. It's telling you in those patents what it's talking about, right?

04:57 A. Very explicitly.

04:57 Q. And it's just like what LVDS is being put out by National Semiconductor, isn't it?

04:57 A. Yep.

04:57 MR. BURESH: I pass the witness, Your Honor.

MR. HALES: Nothing from us, Your Honor.

THE COURT: May he be excused?

MR. HALES: Yes.

THE COURT: Can I have one counsel up here?

(Off-the-record bench conference.)

THE COURT: I already used my joke about staying late. So what we're going to do is the defendant is going to call their next witness. We're going to have him proven up as an expert, which shouldn't take very long. And then we'll be done for the day.

MR. UNDERWOOD: Your Honor, defendants call Mike Newell to the stand.

(The witness was sworn.)

DIRECT EXAMINATION

BY MR. UNDERWOOD:

Q. Good afternoon, Mr. Newell.

Could you please introduce yourself to the ladies and gentlemen of the jury?

A. Sure. My name is Mike Newell.

Q. And can you tell the jury a little bit about yourself, please?

A. Sure. I'm an economic consultant. I've worked and lived in the Midwest for nearly 40 years.

Married to my wife Christin for more than 30 years. And we've managed to raise two beautiful daughters together.

Q. And why are you here to offer testimony today, Mr. Newell?

A. I was asked to evaluate and respond to the opinions of Mr. Lewis, which is ACQIS' damages expert in this case.

Q. And were you retained by the two defendants, my clients in this case?

A. I was. Yes.

Q. Yes. And did you also prepare a set of PowerPoint slides for use in aid of your testimony?

A. I did. Yes.

MR. UNDERWOOD: Can we go to the first slide, please, Derek -- or the second slide, I guess.

BY MR. UNDERWOOD:

Q. Where do you work, Mr. Newell?

A. My firm is called Epsilon Economics.

Q. What does Epsilon Economics do? What kind of business are they in?

A. So it's economic consulting. We do various things, but a lot of what we do is similar to what I'm doing today, which is calculating damages in patent infringement cases such as this.

Q. And what about you personally? What is your role at Epsilon Economics?
A. Well, I'm managing director, and I put -- my practice is primarily focused on economic consulting, calculating damages in patent infringement cases like this.
Q. And how long have you been doing that type of work?
A. More than 20 years.
Q. Would you tell the jury a little bit about your educational background, please?
A. Sure. I've got another slide here, but I've got a bachelor degree in mechanical engineering from the University of Notre Dame. I've also got a master's in business administration from the University of Chicago, Booth School of Business.
Q. And what have you done professionally since you completed your education?
A. Let's see. Right after undergraduate, I worked for a few years as an engineer. But I realized my true passion was in finance and economics. So I went back to school and got an MBA from the University of Chicago.
Q. And since that time, what has your work focused on?

A. Since 2001, I've been focused primarily on economic consulting, again, valuing patent infringement damages in cases like this.

Q. Do you hold any relevant licenses or certifications, Mr. Newell?

A. I do. I've got two in particular I'd like to point out. I'm a certified licensing professional, which is short for CL -- it's a CLP.

I'm also a chartered financial analyst. And both of those certifications require years of training and education. It also requires passing several rigorous exams.

Q. Mr. Newell, are you involved with any organizations related to valuing patents or licensing transactions?

A. I am. I am a member of the Licensing Executive Society, which is a leading professional organization related to the licensing and transactions.

Q. And have you lectured or taught any courses related to intellectual property damages?

A. I have. I've been a guest lecturer at the University of Notre Dame on intellectual property damages. That was at their College of Business.

I've also been a guest lecturer on intellectual property damages at the John Marshall Law

05:04 School in Chicago.
05:04 Q. And do you have any experience with economic
05:04 analysis specifically in patent infringement cases like
05:04 this one?
05:04 A. Yes. Over the course of my career, I've
05:04 worked on over 100 patent infringement cases such as
05:04 this.
05:04 MR. UNDERWOOD: Your Honor, defendants
05:04 offer Mr. Newell as an expert on the valuation of
05:04 intellectual property in the evaluation of patent
05:04 damages.
05:04 MS. HEPLER: No objection.
05:04 THE COURT: He'll be admitted as such.
05:04 Ladies and gentlemen of the jury, thank
05:04 you so much for your attention today. If you'll be
05:04 here tomorrow and ready to go at 8:30.
05:04 So you'll know, here's what I'm
05:05 anticipating is going to happen tomorrow. We have a
05:05 couple more witnesses to take up. But tomorrow
05:05 afternoon you're going to -- this is what you want to
05:05 do your entire life. You're going to get to listen to
05:05 me read a jury charge that takes about an hour. People
05:05 drive from all over to come and get to listen to me
05:05 read.
(Laughter.)

05:05 THE COURT: That's a lie.

05:05 So it will be one of the most painful things that I do as a judge, but I have to do it, to instruct you on the law. You'll have copies of the charge to read along with me, but I still have to read it to you.

05:05 But then it is my favorite part of trials, which is -- and we have very good lawyers, so you'll get to hear the closing arguments in the case tomorrow afternoon and then begin your deliberations.

05:05 I'll tell you in advance, the arguments are just arguments of counsel, but they're very important. And hopefully they'll help you in your deliberations.

05:05 So please remember my instructions tonight. Come tomorrow knowing that you'll begin your deliberations at some point tomorrow afternoon.

05:06 THE BAILIFF: All rise.

05:06 (Jury exited the courtroom.)

05:06 THE COURT: You may step down.

05:06 You may be seated.

05:06 It was a tossup there when you said you went to Notre Dame, whether to qualify you or not, but --

05:06 (Laughter.)

THE COURT: -- I did it anyway.

THE WITNESS: Thank you, Your Honor.

THE COURT: So we're off the record.

(Off-the-record discussion.)

THE COURT: Let's go back on the record.

Is there anything we do need to take up, though? If there is, please let me know.

MS. HEPLER: Nothing from plaintiffs.

MR. BURESH: Nothing for defendants, Your Honor.

THE COURT: Thank you. I'll see you back there, whoever's coming.

(Hearing adjourned.)

UNITED STATES DISTRICT COURT)
WESTERN DISTRICT OF TEXAS)

I, Kristie M. Davis, Official Court Reporter for the United States District Court, Western District of Texas, do certify that the foregoing is a correct transcript from the record of proceedings in the above-entitled matter.

I certify that the transcript fees and format comply with those prescribed by the Court and Judicial Conference of the United States.

Certified to by me this 7th day of April 2024.

/s/ Kristie M. Davis
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05:07